

STATE OF SOUTH DAKOTA
George S. Mickelson, Governor

DEPARTMENT OF WATER AND NATURAL RESOURCES
John J. Smith, Secretary

GEOLOGICAL SURVEY
Merlin J. Tipton, State Geologist

Information Pamphlet No. IP-39

SAND AND GRAVEL RESOURCES IN
UNION COUNTY, SOUTH DAKOTA

by

Martin J. Jarrett

Prepared in cooperation with the
United States Geological Survey,
South Dakota Department of Transportation,
and Union County

Science Center
University of South Dakota
Vermillion, South Dakota

1988

CONTENTS

	Page
INTRODUCTION	1
GEOLOGIC OVERVIEW	1
Till	2
Outwash	2
Alluvium	2
Terrace deposits	2
Bedrock	3
EXPLANATION OF TABLES	3
EXPLANATION OF FIGURES	3
Sand and gravel	6
REFERENCES CITED	10

ILLUSTRATIONS

1. Average cumulative curves of alluvial deposits	4
2. Range in grain-size distribution of preglacial fluvial sands	5
3. Range in grain-size distribution of glacial sands and gravels	7
4. Lithology of coarse glacial deposits	8
5. Map showing test holes, sand and gravel pits, and sand and gravel deposits in Union County	Following 8

TABLES

1. List of test holes in Union County, South Dakota, which contain sand or gravel within 25 feet of the land surface	11
2. List of sand and gravel pits in Union County on file at the Department of Transportation, Division of Highways, Pierre, South Dakota, and at the Department of Water and Natural Resources, Office of Surface Mining, Pierre, South Dakota	50

INTRODUCTION

This pamphlet is one of a series of reports describing the geology and water resources of Union County. It is designed to indicate the most promising areas in which to search for sources of coarse aggregate material. Some comparative grain-size analysis and lithologic data are included to aid in the economic evaluation of various deposits. Further quantitative and qualitative work should be undertaken on any deposit developed, dependent on the material specifications for each intended use.

Other reports in the series include:

- a. Major aquifers in Lincoln and Union Counties, South Dakota: South Dakota Geological Survey, Information Pamphlet, Amundson, F. D., U.S. Geological Survey (in preparation).
- b. Water resources of Lincoln and Union Counties, South Dakota: U.S. Geological Survey, Water Resources Investigations Report, Hansen, D. S. (in preparation).
- c. Geology of Lincoln and Union Counties, South Dakota: South Dakota Geological Survey, Bulletin, Hammond, R. (in preparation).

The first report contains a generalized evaluation of the yield, quality and location of major aquifers (water-bearing deposits) in a condensed, easy to read pamphlet. The second and third reports are more technical and present a more comprehensive investigation of the water resources and geology within the study area. All basic data used to compile these reports are available from the South Dakota Geological Survey's open file.

It is recommended that the following publication, explaining how aggregate-bearing landforms may be recognized, be used as a companion reference to this pamphlet:

Evaluation of exploration methods for coarse aggregate in eastern South Dakota: South Dakota Geological Survey, Report of Investigations 95, Bruce, R. L., and Lundberg, B. E., 1964.

GEOLOGIC OVERVIEW

In Union County, till, alluvium and loess mantle most of the area. In localized areas, outwash, preglacial sands and bedrock may also be found. Most of the Missouri River flood plain is covered by an alluvium consisting of sand with clay lenses, although in a 1 to 3 mile wide area bordering the Big Sioux River, the sediments consist predominantly of clay with sand lenses.

Much of the sand and gravel found in Union County is the result of the glaciers that covered this region thousands of years ago, late in the Pleistocene Epoch. The rest has been deposited by rivers and streams either before glaciation, between glacial episodes, or since the glaciers retreated. The following brief description of geologic terms should be used as an aid in further understanding the deposition of sand and gravel.

Till

Till is the term used to define the unsorted and unstratified material either laid down by an active glacier at the base of the ice, or deposited by a glacier as the ice melted. This mixture of boulders, gravel, sand, silt and clay is often called "boulder clay" or "blue clay." Till covers most of Union County. Although it is not considered a source of sand and gravel, a few small isolated lenses may occur within the till.

Outwash

Outwash is a general term used to describe any deposits of clay, silt, sand, gravel or boulders that have been washed, sorted and subsequently deposited by flowing glacial meltwater. Outwash grain size depends upon material type and the velocity of water from which it was deposited. A lake or slowly flowing stream will usually deposit silts and clays, while rapidly flowing water may leave stream beds composed almost entirely of boulders. Most outwash, however, is a mixture of material between these two extremes, and is composed of an assortment of sand and gravel with minor amounts of finer and coarser materials.

Alluvium

Alluvium is the term used to describe material deposited by streams since the retreat of the glaciers. Made up of clay, silt, sand and gravel, the grain size of any particular deposit is governed by the same factors that determine grain size in glacial outwash. Alluvium occurs in the valleys of present-day streams and rivers, and where deposits consist primarily of sand and gravel, mining for these materials may take place. Most of the surficial deposits found in the Missouri River valley in Union County constitute alluvium.

Terrace Deposits

Terrace deposits are flat topped fluvial deposits that may or may not be of glacial origin. Being remnants of former flood plains, the streams that formed them have since cut their channels deeper and developed new flood plains at lower elevations.

These alluvial or outwash deposits account for a few of the aggregate deposits found in Union County.

Bedrock

Bedrock is the older, consolidated rock beneath the glacial deposits. In Union County, the bedrock consists of Greenhorn Limestone, Carlile Shale and the Niobrara Formation. Although shale and limestone both crop out in Union County, they are unsuitable as a source of coarse aggregate. Generally, when bedrock units are found at or near the ground surface, no sand or gravel exists below that point.

EXPLANATION OF TABLES

Table 1 is a compilation of test holes that encountered sand and/or gravel in the upper 25 feet. This table lists:

- a. Location of the test hole,
- b. Depth of hole, and
- c. Description of aggregate encountered.

The South Dakota Geological Survey, U.S. Geological Survey, South Dakota Division of Water Rights, and private drillers contributed to the formation of this list. The complete set of drill-hole logs are on file at the Office of the South Dakota Geological Survey in Vermillion.

Table 2 has been compiled from a list of gravel pits on file in Pierre with either the South Dakota Department of Transportation or the Office of Surface Mining, Department of Water and Natural Resources. The owner, material type, and where possible, thickness of overburden and aggregate being mined, have been listed. The actual thickness of a deposit may be greater than that mined, because depth to the water table, changing material characteristics, or available mining equipment may limit excavation.

EXPLANATION OF FIGURES

Union County is unusual in that it contains sand and gravel deposits illustrating three distinctly different histories and modes of deposition. These differences can be appreciated by sample inspection and simple size analysis comparison. First, there are the relatively young dune and alluvial deposits associated with the Missouri River valley (fig. 1). These are generally fine deposits--the clean dune sands being the most likely to be used for concrete sand or fill. Secondly, there are the older, fine to coarse fluvial sands (fig. 2), that are probably

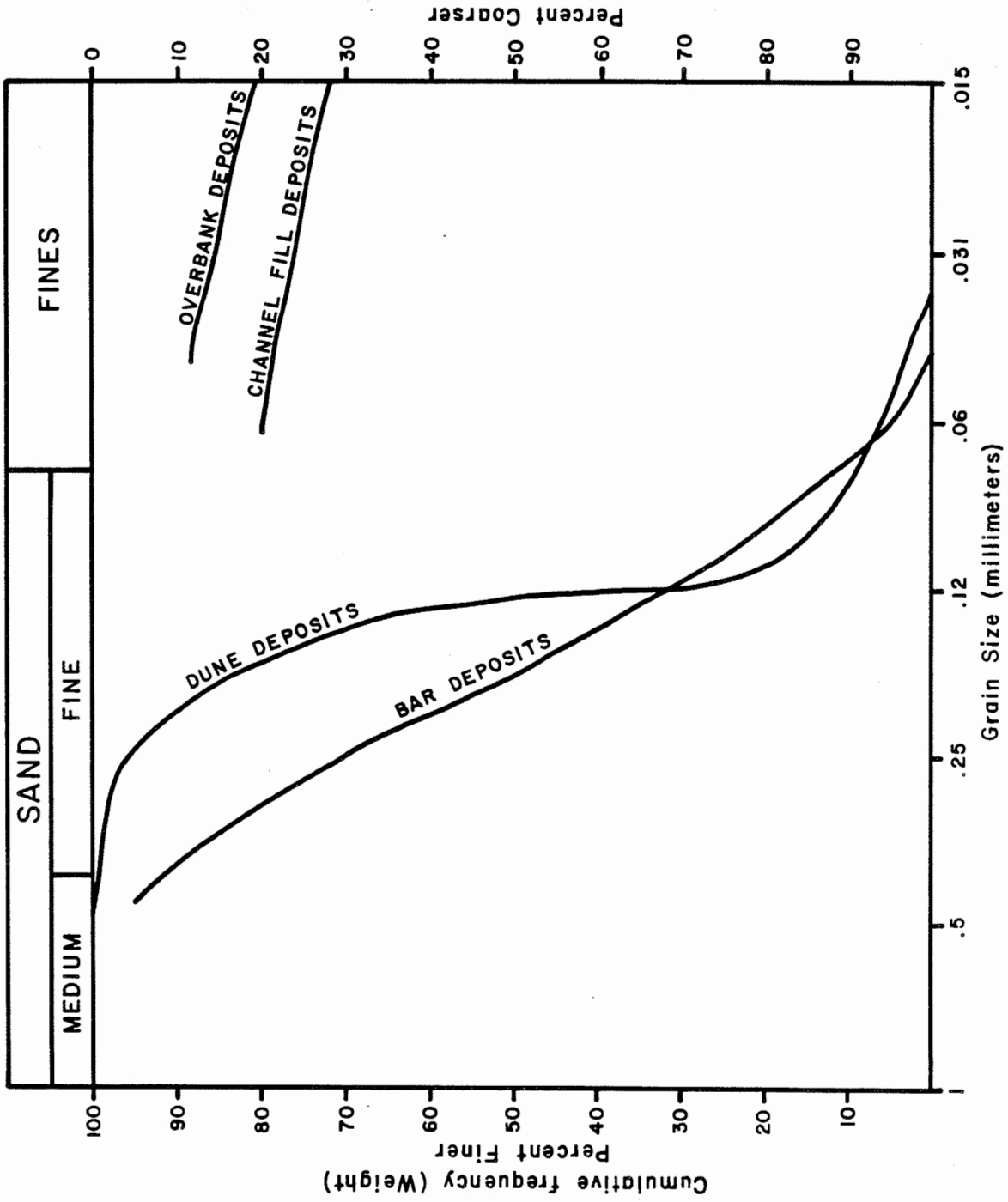


Figure 1. Average Cumulative Curves of Alluvial Deposits.
(Adapted from Douglas, 1959)

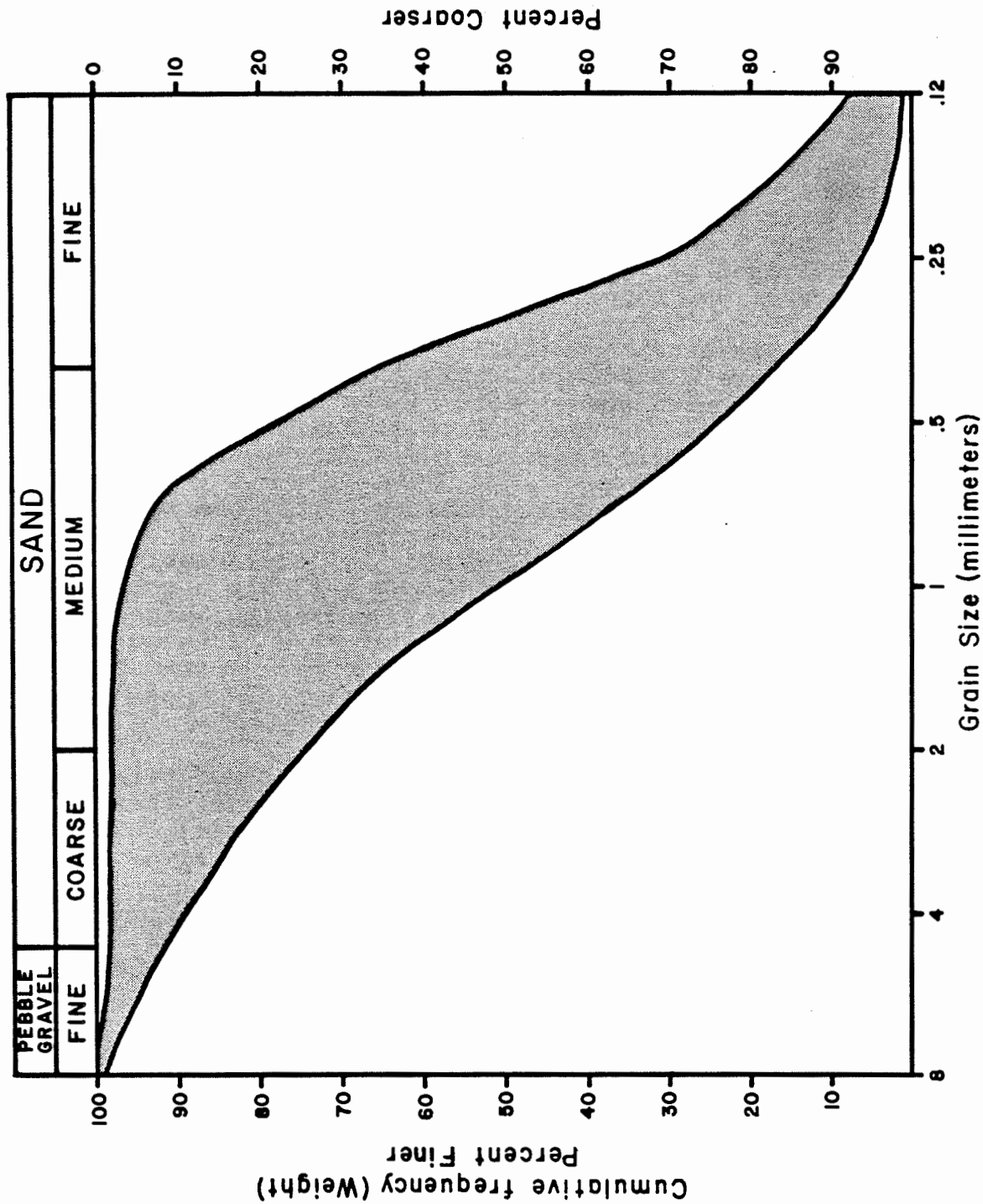


Figure 2. Range in Grain-Size Distribution of Preglacial Fluvial Sands (8 samples).

preglacial in age. Although generally very clean, they are not widespread. Finally, there are the dirty, poorly sorted, medium to very coarse grained glacial deposits (fig. 3). Because of their highly variable lithologies (fig. 4), these deposits are primarily used for road aggregate. To facilitate analysis in figures 1 through 3, only those clasts less than 8 mm were used, though glacial deposits often include many clasts far exceeding this size.

Figure 5 shows the location of test holes, gravel pits (active and inactive), and a few landmarks. Test holes are represented by three types of symbols. A dot (•) indicates the presence of sand or gravel within 25 feet of the land surface with 5 feet or less of overburden. A square (■) indicates that sand or gravel was encountered within 25 feet of the land surface, but that more than 5 feet of overburden existed. The above test holes are numbered and listed in table 1. An open circle (◦) indicates that no sand or gravel was found in the upper 25 feet.

Gravel pits are labelled with a crossed pick and shovel (⌘), those numbered are listed in table 2. Additional information concerning the numbered gravel pits is on file with the Department of Transportation or the Office of Surface Mining, Department of Water and Natural Resources, Pierre, South Dakota.

To help illustrate the most promising areas, the map has been divided into three area types, each expressing the probability of discovering new sources of economically extractable sand or gravel. Those areas designated as "good" indicate a comparatively thick deposit with thin overburden and underlying large tracts of land. Those considered "fair" lack one or more of these favorable attributes. Areas designated as "good" or "fair" have been assigned a color as well as a letter, and are discussed later in the text.

Areas designated as poor are composed mainly of till but may contain random deposits of sand and gravel. Many of these deposits have been located by test holes and gravel pits on the map. Although some of these deposits may be very productive, they are generally limited and difficult to locate.

The above three classifications evolved through an extensive test hole drilling program, the study of gravel pits and their locations, topographic map and aerial photography interpretations and field observations.

Sand and Gravel

Area "A" represents post glacial alluvial deposits of the Missouri River. These sands were deposited by various fluvial actions resulting in their deposition as dune bar, overbank and channel-fill sediments. Test-hole data revealed the deposits to be predominantly a fine quartz sand, widespread, and to a depth

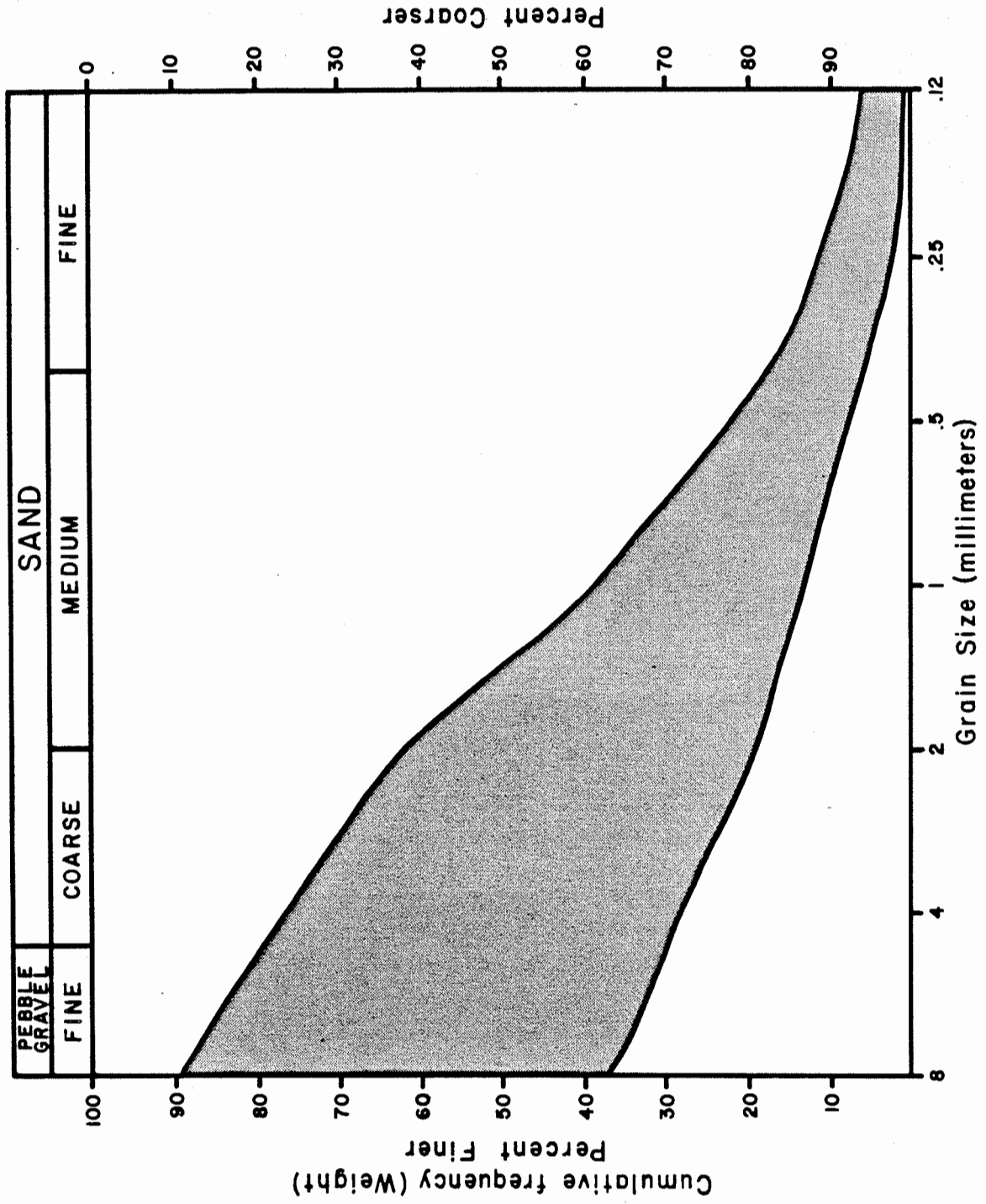


Figure 3. Range in Grain-Size Distribution of Glacial Sands and Gravels (finer fraction - II samples).

RICHLAND AREA - UNION COUNTY

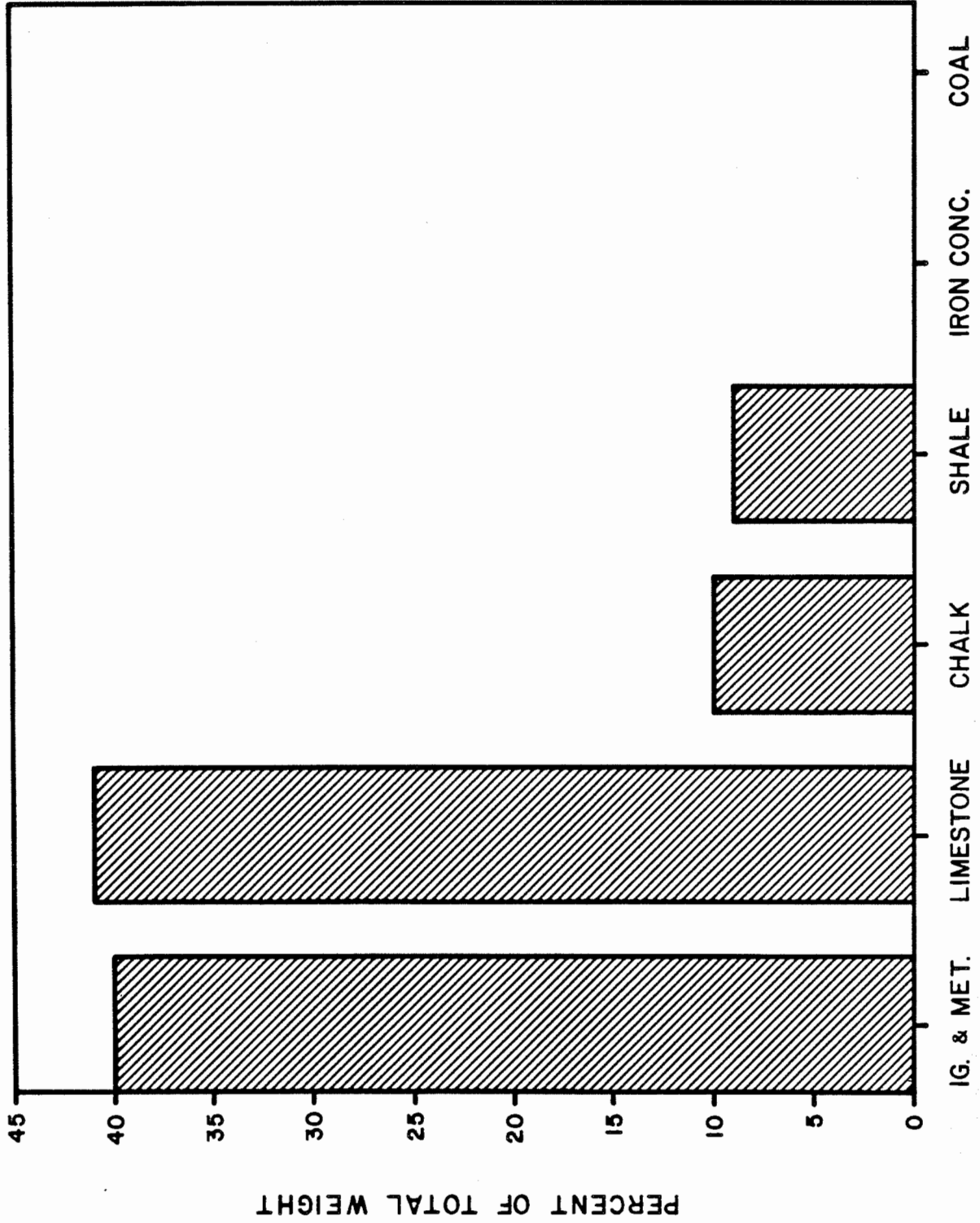


Figure 4. Lithology of Coarse Glacial Deposits.
(After Jorgensen, 1960)

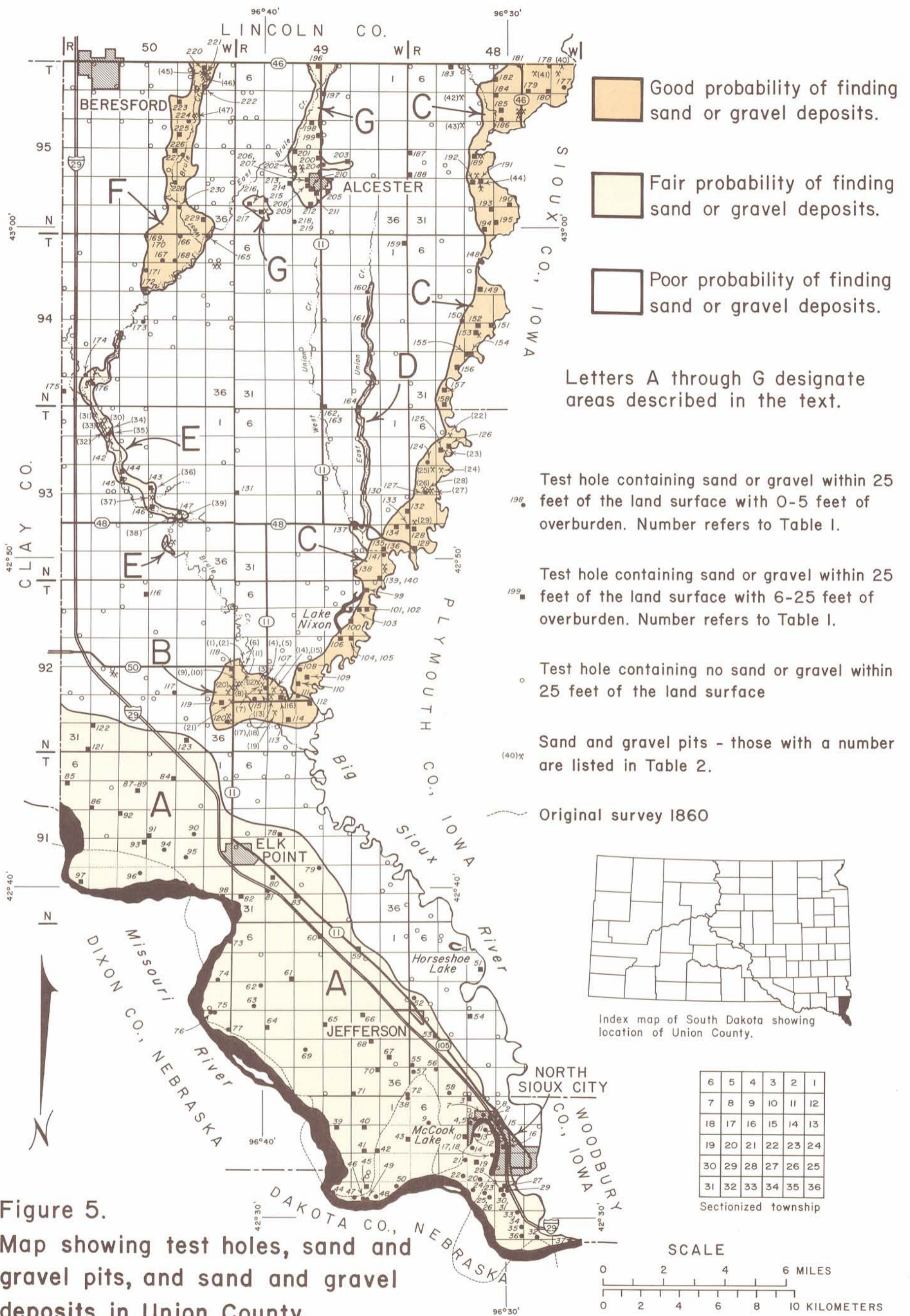


Figure 5. Map showing test holes, sand and gravel pits, and sand and gravel deposits in Union County.

of 100+ feet. However, these deposits have been designated "fair" due to their fine texture (fig. 1) and impurities. They are therefore of little value as a fine aggregate in plaster or concrete, but can be used in some bituminous applications and as fill material in the construction industry.

Area "B" (designated "good") is situated at the confluence of the Brule Creek, Big Sioux and Missouri River valleys. This valley outwash deposit represents the remnants of delta fan sediments laid down by glacial meltwaters. The majority of these deposits exhibit an overburden of less than 5 feet, and for the most part average more than 50 feet in total thickness. Aggregate from this heavily mined area is primarily used as a source of road aggregate because of the high percentages of limestone, chalk and shale pebbles (fig. 4).

In area "C" (designated "good"), large volumes of glacial sand and gravel are located in the vicinity of the present-day Big Sioux River. Most of the aggregate exists as flood plain terrace deposits and may underlie as much as 20 square miles extending from the Lincoln County line to the Richland area. Although deposits were generally found to have in excess of 5 feet of overburden, aggregate thicknesses of 20 to 40 feet were common. The removal of the silty, alluvial overburden does not appear to inhibit pit development as the area is already heavily mined. Shallow water table conditions may limit excavation depth unless dredging equipment is used.

Area "D" (designated "fair") represents small, discontinuous sand deposits found along the valley floor of East Union Creek. Most individual deposits were saturated within a few feet of ground surface, and most had more than 5 feet of overburden. These sands are probably remnants of preglacial fluvial deposits. Although they have been reworked by glacial action, they are still generally clean, and almost totally comprised of quartz and feldspar clasts, i.e., very little "soft rock material."

Area "E" (designated "fair") exhibits scattered terrace and valley-floor deposits along Brule Creek. In the northern part of this area, where overburden averages less than 2 feet, most of the larger deposits are already developed. In the southern half, where most of the deposits constitute valley-floor deposits, overburden averages over 10 feet.

Area "F" (designated "good") contains widespread deposits that have little overburden and often attain thicknesses of over 30 feet. Most of the deposits are reworked preglacial sands (see Area "D" text), and grain size is generally small. One exception to this is found in the northern section of this area where there exists up to 20 feet of coarser glacial outwash overlying these reworked sands. Pits have already been developed in this outwash.

Area "G" (designated "fair") is similar to Area "F" in that the majority of deposits are made up of clean, preglacial sands

and fine gravels. These deposits do not appear to have been reworked to the extent of those in Area "F". One disadvantage is that they are covered, on average, by more than 15 feet of overburden material.

The remainder of Union County has been mapped as "poor," though some areas will contain sand or gravel deposits. Two such examples can be seen in the western half of section 31, Township 94, Range 48; and also in the western half of section 4, Township 95, Range 48. Both of these deposits characterize additional preglacial sand accumulations. Due to the randomly scattered nature of such deposits, exploration efforts should first be concentrated in those areas marked "good" and "fair."

Some of the geologic and economic factors to consider in selecting a quarry site include size, quality of the outcrop, overburden thickness, local water levels, development costs, transportation costs, future markets, and material specifications.

REFERENCES CITED

- Jorgensen, D. G., 1960, Geology and shallow ground water resources of the Missouri Valley between North Sioux City and Yankton, South Dakota: South Dakota Geological Survey, Report of Investigations 86, 54 p.
- Douglas, C. H., 1959, Fine and medium grained alluvial deposits along the Missouri River between Yankton, South Dakota, and Sioux City, Iowa: Unpublished Master's thesis, University of South Dakota, Vermillion, South Dakota, 65 p.

TABLE 1. LIST OF TEST HOLES IN UNION COUNTY, SOUTH DAKOTA, WHICH CONTAIN SAND OR GRAVEL WITHIN 25 FEET OF THE LAND SURFACE.

LITHOLOGIC DESCRIPTIONS, AS LISTED, HAVE BEEN CONDENSED FROM DATA CONTAINED IN LOGS ON FILE AT THE SOUTH DAKOTA GEOLOGICAL SURVEY OFFICE, VERMILLION, SOUTH DAKOTA, AND CONTAIN ONLY INFORMATION WHICH HAS BEEN DEEMED MOST USEFUL FOR THIS STUDY. NUMERICAL VALUES INDICATE DEPTH IN FEET BELOW LAND SURFACE.

TEST HOLE NUMBER: 1
 LOCATION: 089N-48W-03CCC
 LEGAL LOCATION: SW SW SW SEC. 03, T. 089 N., R. 48 W.

21.0 - 57.0 SAND, FINE

* * * *

TEST HOLE NUMBER: 2
 LOCATION: 089N-48W-03CCCC
 LEGAL LOCATION: SW SW SW SW SEC. 03, T. 089 N., R. 48 W.

11.0 - 37.0 SAND, BROWN, VERY SILTY; VERY SOFT

* * * *

TEST HOLE NUMBER: 3
 LOCATION: 089N-48W-04BBBB
 LEGAL LOCATION: NW NW NW NW SEC. 04, T. 089 N., R. 48 W.

18.0 - 27.0 SAND, MEDIUM

* * * *

TEST HOLE NUMBER: 4
 LOCATION: 089N-48W-04CCCC
 LEGAL LOCATION: SW SW SW SW SEC. 04, T. 089 N., R. 48 W.

13.0 - 21.0 SAND, DARK-BROWN, FINE TO MEDIUM

* * * *

TEST HOLE NUMBER: 5
 LOCATION: 089N-48W-04CCCC 1
 LEGAL LOCATION: SW SW SW SW SEC. 04, T. 089 N., R. 48 W.

14.0 - 21.0 SAND, DARK-BROWN, FINE TO MEDIUM,
 SUBROUNDED

* * * *

TEST HOLE NUMBER: 6
 LOCATION: 089N-48W-04CDBB

LEGAL LOCATION: NW NW SE SW SEC. 04, T. 089 N., R. 48 W.

2.0 - 32.0 SAND, BROWN, FINE

* * * *

TEST HOLE NUMBER: 7

LOCATION: 089N-48W-04DBCA

LEGAL LOCATION: NE SW NW SE SEC. 04, T. 089 N., R. 48 W.

2.0 - 8.0 SAND, BROWN, FINE

8.0 - 33.0 SAND, DARK-BROWN TO GRAY, SILTY

* * * *

TEST HOLE NUMBER: 8

LOCATION: 089N-48W-04DDBA

LEGAL LOCATION: NE NW SE SE SEC. 04, T. 089 N., R. 48 W.

12.0 - 14.0 SAND, LIGHT-BROWN, VERY FINE TO FINE,
SILTY, CLAYEY

* * * *

TEST HOLE NUMBER: 9

LOCATION: 089N-48W-06DCDD

LEGAL LOCATION: SE SE SW SE SEC. 06, T. 089 N., R. 48 W.

3.0 - 15.0 SAND, LIGHT-BROWN, VERY FINE; VERY CLEAN,
QUARTZOSE, OXIDIZED, MOIST FROM 8 FEET

15.0 - 58.0 SAND, GRAY, FINE; VERY CLEAN, QUARTZOSE,
UNOXIDIZED, MOIST

* * * *

TEST HOLE NUMBER: 10

LOCATION: 089N-48W-08ADDA

LEGAL LOCATION: NE SE SE NE SEC. 08, T. 089 N., R. 48 W.

8.0 - 37.0 SAND, BROWN, FINE

* * * *

TEST HOLE NUMBER: 11

LOCATION: 089N-48W-09ABDB

LEGAL LOCATION: NW SE NW NE SEC. 09, T. 089 N., R. 48 W.

0 - 51.0 SAND, FINE

* * * *

TEST HOLE NUMBER: 12

LOCATION: 089N-48W-09BDBC

LEGAL LOCATION: SW NW SE NW SEC. 09, T. 089 N., R. 48 W.

0 - 45.0 SAND, FINE

* * * *

TEST HOLE NUMBER: 13
LOCATION: 089N-48W-09BDBD
LEGAL LOCATION: SE NW SE NW SEC. 09, T. 089 N., R. 48 W.

0 - 56.0 SAND, VERY FINE

* * * *

TEST HOLE NUMBER: 14
LOCATION: 089N-48W-09CCAB
LEGAL LOCATION: NW NE SW SW SEC. 09, T. 089 N., R. 48 W.

2.0 - 37.0 SAND, BROWN, FINE TO MEDIUM

* * * *

TEST HOLE NUMBER: 15
LOCATION: 089N-48W-10BABB
LEGAL LOCATION: NW NW NE NW SEC. 10, T. 089 N., R. 48 W.

20.0 - 55.0 SAND, FINE, WITH CLAY STREAKS

* * * *

TEST HOLE NUMBER: 16
LOCATION: 089N-48W-15CACD
LEGAL LOCATION: SE SW NE SW SEC. 15, T. 089 N., R. 48 W.

24.0 - 31.0 SAND, BROWN TO BLACK, FINE, SILTY

* * * *

TEST HOLE NUMBER: 17
LOCATION: 089N-48W-16AAAB
LEGAL LOCATION: NW NE NE NE SEC. 16, T. 089 N., R. 48 W.

1.0 - 6.0 SAND, RED-BROWN, VERY FINE TO FINE,
ROUNDED

6.0 - 27.0 SAND, GRAY, VERY FINE TO FINE

* * * *

TEST HOLE NUMBER: 18
LOCATION: 089N-48W-16AAAB 1
LEGAL LOCATION: NW NE NE NE SEC. 16, T. 089 N., R. 48 W.

1.0 - 6.0 SAND, FINE; AND SOME BROWN SILT

* * * *

TEST HOLE NUMBER: 19
LOCATION: 089N-48W-16BDBA
LEGAL LOCATION: NE NW SE NW SEC. 16, T. 089 N., R. 48 W.

11.0 - 37.0 SAND, BLACK TO BROWN, FINE; SOME SILT

* * * *

TEST HOLE NUMBER: 20
LOCATION: 089N-48W-16CDDD
LEGAL LOCATION: SE SE SE SW SEC. 16, T. 089 N., R. 48 W.

2.0 - 14.0 SAND, LIGHT-BROWN, FINE TO VERY FINE;
CLEAN

14.0 - 28.0 SAND, LIGHT-GRAY, FINE, ROUNDED; CLEAN

* * * *

TEST HOLE NUMBER: 21
LOCATION: 089N-48W-17AADD
LEGAL LOCATION: SE SE NE NE SEC. 17, T. 089 N., R. 48 W.

2.0 - 9.0 SAND, BROWN, FINE

* * * *

TEST HOLE NUMBER: 22
LOCATION: 089N-48W-17DDBA
LEGAL LOCATION: NE NW SE SE SEC. 17, T. 089 N., R. 48 W.

0 - 6.0 SAND, BROWN, FINE

* * * *

TEST HOLE NUMBER: 23
LOCATION: 089N-48W-21AC
LEGAL LOCATION: SW NE SEC. 21, T. 089 N., R. 48 W.

4.0 - 107.0 SAND, MEDIUM

* * * *

TEST HOLE NUMBER: 24
LOCATION: 089N-48W-21BCAA
LEGAL LOCATION: NE NE SW NW SEC. 21, T. 089 N., R. 48 W.

2.0 - 9.0 SAND, FINE, ROUNDED

17.0 - 34.0 SAND, FINE, ROUNDED

* * * *

TEST HOLE NUMBER: 25
LOCATION: 089N-48W-21DABB
LEGAL LOCATION: NW NW NE SE SEC. 21, T. 089 N., R. 48 W.

1.0 - 44.0 SAND, FINE

* * * *

TEST HOLE NUMBER: 26
LOCATION: 089N-48W-21DABB 1
LEGAL LOCATION: NW NW NE SE SEC. 21, T. 089 N., R. 48 W.

1.0 - 45.0 SAND, BROWN, FINE

* * * *

TEST HOLE NUMBER: 27
LOCATION: 089N-48W-22BAAD
LEGAL LOCATION: SE NE NE NW SEC. 22, T. 089 N., R. 48 W.

6.0 - 28.0 SAND, MEDIUM

* * * *

TEST HOLE NUMBER: 28
LOCATION: 089N-48W-22BCAA
LEGAL LOCATION: NE NE SW NW SEC. 22, T. 089 N., R. 48 W.

10.0 - 17.0 SAND, FINE

* * * *

TEST HOLE NUMBER: 29
LOCATION: 089N-48W-22BDAA
LEGAL LOCATION: NE NE SE NW SEC. 22, T. 089 N., R. 48 W.

1.0 - 65.0 SAND, MEDIUM

* * * *

TEST HOLE NUMBER: 30
LOCATION: 089N-48W-22BDCC
LEGAL LOCATION: SW SW SE NW SEC. 22, T. 089 N., R. 48 W.

2.0 - 15.0 SAND, BROWN, FINE, VERY SILTY

* * * *

TEST HOLE NUMBER: 31
LOCATION: 089N-48W-22BDCC 2
LEGAL LOCATION: SW SW SE NW SEC. 22, T. 089 N., R. 48 W.

3.0 - 46.0 SAND, MEDIUM

* * * *

TEST HOLE NUMBER: 32
LOCATION: 089N-48W-26CDDD

LEGAL LOCATION: SE SE SE SW SEC. 26, T. 089 N., R. 48 W.

2.0 - 75.0 SAND, BROWN, FINE; SOME GRAVEL LAYERS 6
INCHES TO 1 FOOT THICK, MEDIUM TO
COARSE

* * * *

TEST HOLE NUMBER: 33
LOCATION: 089N-48W-27AABA 1
LEGAL LOCATION: NE NW NE NE SEC. 27, T. 089 N., R. 48 W.

4.0 - 55.0 SAND, FINE TO MEDIUM

* * * *

TEST HOLE NUMBER: 34
LOCATION: 089N-48W-27AABA 2
LEGAL LOCATION: NE NW NE NE SEC. 27, T. 089 N., R. 48 W.

5.0 - 70.0 SAND, FINE TO MEDIUM

* * * *

TEST HOLE NUMBER: 35
LOCATION: 089N-48W-27DAAA
LEGAL LOCATION: NE NE NE SE SEC. 27, T. 089 N., R. 48 W.

3.0 - 65.0 SAND, BROWN, FINE

* * * *

TEST HOLE NUMBER: 36
LOCATION: 089N-48W-27DDDA
LEGAL LOCATION: NE SE SE SE SEC. 27, T. 089 N., R. 48 W.

2.0 - 27.0 SAND, MEDIUM

* * * *

TEST HOLE NUMBER: 37
LOCATION: 089N-48W-36ABBA
LEGAL LOCATION: NE NW NW NE SEC. 36, T. 089 N., R. 48 W.

0 - 6.0 SAND, BROWN, FINE, SILTY
6.0 - 35.0 SAND, BROWN, FINE

* * * *

TEST HOLE NUMBER: 38
LOCATION: 089N-49W-01AAAA
LEGAL LOCATION: NE NE NE NE SEC. 01, T. 089 N., R. 49 W.

0 - 54.0 SAND, BROWN, FINE, SLIGHTLY CLAYEY;

OXIDIZED, SATURATED AT 4 FEET

* * * *

TEST HOLE NUMBER: 39
LOCATION: 089N-49W-10ABBB
LEGAL LOCATION: NW NW NW NE SEC. 10, T. 089 N., R. 49 W.

24.0 - 52.0 SAND, FINE, SILTY

* * * *

TEST HOLE NUMBER: 40
LOCATION: 089N-49W-11BAAA
LEGAL LOCATION: NE NE NE NW SEC. 11, T. 089 N., R. 49 W.

16.0 - 54.0 SAND, FINE, SILTY

* * * *

TEST HOLE NUMBER: 41
LOCATION: 089N-49W-11CDDD
LEGAL LOCATION: SE SE SE SW SEC. 11, T. 089 N., R. 49 W.

15.0 - 52.0 SAND, GRAY, VERY FINE, VERY SILTY

* * * *

TEST HOLE NUMBER: 42
LOCATION: 089N-49W-11DDDD
LEGAL LOCATION: SE SE SE SE SEC. 11, T. 089 N., R. 49 W.

0 - 73.0 SAND, FINE TO MEDIUM

* * * *

TEST HOLE NUMBER: 43
LOCATION: 089N-49W-12DAAA
LEGAL LOCATION: NE NE NE SE SEC. 12, T. 089 N., R. 49 W.

6.0 - 54.0 SAND, REDDISH-BROWN, FINE, SILTY; CLEAN,
OXIDIZED, DRY, SATURATED AT 15 FEET

* * * *

TEST HOLE NUMBER: 44
LOCATION: 089N-49W-22BDCB
LEGAL LOCATION: NW SW SE NW SEC. 22, T. 089 N., R. 49 W.

1.0 - 50.0 SAND, BROWN, FINE

* * * *

TEST HOLE NUMBER: 45

LOCATION: 089N-49W-23ABCD

LEGAL LOCATION: SE SW NW NE SEC. 23, T. 089 N., R. 49 W.

11.0 - 41.0 SAND, FINE

* * * *

TEST HOLE NUMBER: 46

LOCATION: 089N-49W-23CADD

LEGAL LOCATION: SE SE NE SW SEC. 23, T. 089 N., R. 49 W.

0 - 3.0 SAND, FINE

11.0 - 23.0 SAND, BROWN, FINE

23.0 - 72.0 SAND AND SILT, BLACK SAND AND DARK-GRAY
SILT

* * * *

TEST HOLE NUMBER: 47

LOCATION: 089N-49W-23CBBA

LEGAL LOCATION: NE NW NW SW SEC. 23, T. 089 N., R. 49 W.

2.0 - 17.0 SAND, BROWN, FINE

17.0 - 42.0 SAND, BLACK TO BROWN, FINE

* * * *

TEST HOLE NUMBER: 48

LOCATION: 089N-49W-23DAAB

LEGAL LOCATION: NW NE NE SE SEC. 23, T. 089 N., R. 49 W.

1.0 - 21.0 SAND, BROWN, FINE

21.0 - 42.0 SAND, BLACK TO BROWN; SOME CLAY LENSES

* * * *

TEST HOLE NUMBER: 49

LOCATION: 089N-49W-23DBCC

LEGAL LOCATION: SW SW NW SE SEC. 23, T. 089 N., R. 49 W.

0 - 4.0 SAND, FINE

11.0 - 22.0 SAND, BROWN, FINE

22.0 - 36.0 SAND, BLACK, FINE

* * * *

TEST HOLE NUMBER: 50

LOCATION: 089N-49W-24ABCB

LEGAL LOCATION: NW SW NW NE SEC. 24, T. 089 N., R. 49 W.

1.0 - 54.0 SAND, BROWN, FINE; WITH BROWN CLAY LENSES

* * * *

TEST HOLE NUMBER: 51
LOCATION: 090N-48W-09CAAA
LEGAL LOCATION: NE NE NE SW SEC. 09, T. 090 N., R. 48 W.

10.0 - 23.0 SAND, VERY FINE; WITH CLAY
24.0 - 39.0 SAND, FINE; WITH CLAY

* * * *

TEST HOLE NUMBER: 52
LOCATION: 090N-48W-18CBAC
LEGAL LOCATION: SW NE NW SW SEC. 18, T. 090 N., R. 48 W.

0 - 100.0 SAND, FLUVIAL

* * * *

TEST HOLE NUMBER: 53
LOCATION: 090N-48W-19DDD
LEGAL LOCATION: SE SE SE SEC. 19, T. 090 N., R. 48 W.

22.0 - 61.0 SAND, FINE

* * * *

TEST HOLE NUMBER: 54
LOCATION: 090N-48W-21BBC
LEGAL LOCATION: SW NW NW SEC. 21, T. 090 N., R. 48 W.

18.0 - 56.0 SAND, FINE

* * * *

TEST HOLE NUMBER: 55
LOCATION: 090N-48W-30CCCC
LEGAL LOCATION: SW SW SW SW SEC. 30, T. 090 N., R. 48 W.

3.0 - 30.0 SAND, MEDIUM

* * * *

TEST HOLE NUMBER: 56
LOCATION: 090N-48W-31AAAA
LEGAL LOCATION: NE NE NE NE SEC. 31, T. 090 N., R. 48 W.

4.0 - 22.0 SAND, MEDIUM; SOME CLAY LAYERS

* * * *

TEST HOLE NUMBER: 57
LOCATION: 090N-48W-31BB
LEGAL LOCATION: NW NW SEC. 31, T. 090 N., R. 48 W.

4.0 - 12.0 SAND

16.0 - 40.0 SAND, BLACK

* * * *

TEST HOLE NUMBER: 58
LOCATION: 090N-48W-32CD
LEGAL LOCATION: SE SW SEC. 32, T. 090 N., R. 48 W.

4.0 - 24.0 SAND, FINE; AND CLAY

* * * *

TEST HOLE NUMBER: 59
LOCATION: 090N-49W-02CCDA
LEGAL LOCATION: NE SE SW SW SEC. 02, T. 090 N., R. 49 W.

14.0 - 41.0 SAND, FINE

* * * *

TEST HOLE NUMBER: 60
LOCATION: 090N-49W-04ADDD
LEGAL LOCATION: SE SE SE NE SEC. 04, T. 090 N., R. 49 W.

7.0 - 11.0 SAND, YELLOW, FINE, CLAYEY

* * * *

TEST HOLE NUMBER: 61
LOCATION: 090N-49W-08DDDD
LEGAL LOCATION: SE SE SE SE SEC. 08, T. 090 N., R. 49 W.

16.0 - 42.0 SAND, FINE TO MEDIUM

* * * *

TEST HOLE NUMBER: 62
LOCATION: 090N-49W-18AA
LEGAL LOCATION: NE NE SEC. 18, T. 090 N., R. 49 W.

4.0 - 29.0 SAND, FINE

* * * *

TEST HOLE NUMBER: 63
LOCATION: 090N-49W-18DC
LEGAL LOCATION: SW SE SEC. 18, T. 090 N., R. 49 W.

1.0 - 4.0 SAND, FINE
16.0 - 19.0 SAND, FINE

* * * *

TEST HOLE NUMBER: 64

LOCATION: 090N-49W-20CBBC

LEGAL LOCATION: SW NW NW SW SEC. 20, T. 090 N., R. 49 W.

11.0 - 16.0 SAND, TAN, FINE TO MEDIUM; OXIDIZED
16.0 - 58.0 SAND, GRAY, FINE TO MEDIUM; UNOXIDIZED

* * * *

TEST HOLE NUMBER: 65

LOCATION: 090N-49W-22BCCC

LEGAL LOCATION: SW SW SW NW SEC. 22, T. 090 N., R. 49 W.

16.0 - 56.0 SAND, WHITE TO GRAY, FINE TO COARSE;
SUB- TO WELL-ROUNDED; MUCH COLORLESS
TRANSPARENT QUARTZ AND GREEN GRAINS
AS WELL AS SOME DARK MINERALS

* * * *

TEST HOLE NUMBER: 66

LOCATION: 090N-49W-23BA

LEGAL LOCATION: NE NW SEC. 23, T. 090 N., R. 49 W.

16.0 - 48.0 SAND, FINE

* * * *

TEST HOLE NUMBER: 67

LOCATION: 090N-49W-25CAB

LEGAL LOCATION: NW NE SW SEC. 25, T. 090 N., R. 49 W.

18.0 - 23.0 GRAVEL

* * * *

TEST HOLE NUMBER: 68

LOCATION: 090N-49W-26ABAA

LEGAL LOCATION: NE NE NW NE SEC. 26, T. 090 N., R. 49 W.

17.0 - 58.0 SAND, FINE TO MEDIUM; CLAY LAYER BETWEEN
44 AND 47 FEET

* * * *

TEST HOLE NUMBER: 69

LOCATION: 090N-49W-28BD

LEGAL LOCATION: SE NW SEC. 28, T. 090 N., R. 49 W.

1.0 - 26.0 SAND AND CLAY, FINE SAND

* * * *

TEST HOLE NUMBER: 70

LOCATION: 090N-49W-35AAAA

LEGAL LOCATION: NE NE NE NE SEC. 35, T. 090 N., R. 49 W.

7.0 - 27.0 SAND, VERY FINE

* * * *

TEST HOLE NUMBER: 71

LOCATION: 090N-49W-35CCCC

LEGAL LOCATION: SW SW SW SW SEC. 35, T. 090 N., R. 49 W.

22.0 - 45.0 SAND, FINE, SILTY; COMPACT

* * * *

TEST HOLE NUMBER: 72

LOCATION: 090N-49W-36DDDD

LEGAL LOCATION: SE SE SE SE SEC. 36, T. 090 N., R. 49 W.

1.0 - 42.0 SAND, TAN TO GRAY, SILT TO FINE SAND SIZE
GRADING DOWNWARD TO MEDIUM SIZED,
SUBANGULAR TO SUBROUNDED

* * * *

TEST HOLE NUMBER: 73

LOCATION: 090N-50W-01DAAA

LEGAL LOCATION: NE NE NE SE SEC. 01, T. 090 N., R. 50 W.

1.0 - 8.0 SAND, BROWN, FINE

* * * *

TEST HOLE NUMBER: 74

LOCATION: 090N-50W-12DCCC

LEGAL LOCATION: SW SW SW SE SEC. 12, T. 090 N., R. 50 W.

2.0 - 7.0 SAND, BROWN, FINE

* * * *

TEST HOLE NUMBER: 75

LOCATION: 090N-50W-24BAAA

LEGAL LOCATION: NE NE NE NW SEC. 24, T. 090 N., R. 50 W.

0 - 30.0 SAND, TAN AND GRAY, FINE TO MEDIUM;
SOME INTERBEDDED TAN SILT AND CLAY,
PEBBLES IN 30-FOOT SAMPLE

* * * *

TEST HOLE NUMBER: 76

LOCATION: 090N-50W-24BABB

LEGAL LOCATION: NW NW NE NW SEC. 24, T. 090 N., R. 50 W.

1.0 - 13.0 SAND, BROWN, FINE

* * * *

TEST HOLE NUMBER: 77
LOCATION: 090N-50W-24DDAA
LEGAL LOCATION: NE NE SE SE SEC. 24, T. 090 N., R. 50 W.

1.0 - 9.0 SAND, BROWN, FINE
21.0 - 33.0 SAND, BROWN, FINE

* * * *

TEST HOLE NUMBER: 78
LOCATION: 091N-49W-17CDDD
LEGAL LOCATION: SE SE SE SW SEC. 17, T. 091 N., R. 49 W.

12.0 - 14.0 SAND, FINE TO MEDIUM

* * * *

TEST HOLE NUMBER: 79
LOCATION: 091N-49W-28AA
LEGAL LOCATION: NE NE SEC. 28, T. 091 N., R. 49 W.

4.0 - 24.0 SAND, FINE; AND SILT

* * * *

TEST HOLE NUMBER: 80
LOCATION: 091N-49W-29BDCB
LEGAL LOCATION: NW SW SE NW SEC. 29, T. 091 N., R. 49 W.

22.0 - 69.0 SAND, FINE

* * * *

TEST HOLE NUMBER: 81
LOCATION: 091N-49W-29CCBD
LEGAL LOCATION: SE NW SW SW SEC. 29, T. 091 N., R. 49 W.

3.0 - 46.0 SAND, FINE

* * * *

TEST HOLE NUMBER: 82
LOCATION: 091N-49W-31BBAA
LEGAL LOCATION: NE NE NW NW SEC. 31, T. 091 N., R. 49 W.

10.0 - 22.0 SAND, REDDISH-BROWN, VERY FINE, SILTY;
DRY, OXIDIZED
22.0 - 58.0 SAND, GRAY, FINE, SILTY; MOIST,
UNOXIDIZED

* * * *

TEST HOLE NUMBER: 83
LOCATION: 091N-49W-33BBBB 1
LEGAL LOCATION: NW NW NW NW SEC. 33, T. 091 N., R. 49 W.

25.0 - 35.0 SAND, FINE; EXTREMELY LOOSE, TOOK LOTS
OF WATER

* * * *

TEST HOLE NUMBER: 84
LOCATION: 091N-50W-03DDDD
LEGAL LOCATION: SE SE SE SE SEC. 03, T. 091 N., R. 50 W.

21.0 - 58.0 SAND, TAN-BROWN, FINE, SILTY; OXIDIZED,
SATURATED

* * * *

TEST HOLE NUMBER: 85
LOCATION: 091N-50W-07BBAA
LEGAL LOCATION: NE NE NW NW SEC. 07, T. 091 N., R. 50 W.

19.0 - 52.0 SAND, LIGHT-BROWN, FINE TO MEDIUM,
SLIGHTLY CLAYEY; OXIDIZED

* * * *

TEST HOLE NUMBER: 86
LOCATION: 091N-50W-08CCCC
LEGAL LOCATION: SW SW SW SW SEC. 08, T. 091 N., R. 50 W.

18.0 - 50.0 SAND, DARK-GRAY, VERY FINE, CLAYEY,
SILTY; UNOXIDIZED, SATURATED

* * * *

TEST HOLE NUMBER: 87
LOCATION: 091N-50W-09ACAD 1
LEGAL LOCATION: SE NE SW NE SEC. 09, T. 091 N., R. 50 W.

11.0 - 52.0 SAND, FINE; SAMPLED AT 40 FEET

* * * *

TEST HOLE NUMBER: 88
LOCATION: 091N-50W-09ACAD 2
LEGAL LOCATION: SE NE SW NE SEC. 09, T. 091 N., R. 50 W.

6.0 - 72.0 SAND, GRAY, MEDIUM TO COARSE,
WELL-SORTED; LOTS OF CLEAR QUARTZ
GRAINS, COHESIVE-LIKE MATERIAL

* * * *

TEST HOLE NUMBER: 89
LOCATION: 091N-50W-09ACAD 3
LEGAL LOCATION: SE NE SW NE SEC. 09, T. 091 N., R. 50 W.

6.0 - 32.0 SAND, GRAY, MEDIUM TO COARSE

* * * *

TEST HOLE NUMBER: 90
LOCATION: 091N-50W-14DC
LEGAL LOCATION: SW SE SEC. 14, T. 091 N., R. 50 W.

0 - 18.0 SAND AND CLAY
18.0 - 38.0 SAND, FINE; AND SILT

* * * *

TEST HOLE NUMBER: 91
LOCATION: 091N-50W-15CCCC 2
LEGAL LOCATION: SW SW SW SW SEC. 15, T. 091 N., R. 50 W.

21.0 - 60.0 SAND, SILTY

* * * *

TEST HOLE NUMBER: 92
LOCATION: 091N-50W-16BBBC
LEGAL LOCATION: SW NW NW NW SEC. 16, T. 091 N., R. 50 W.

7.0 - 22.0 SAND, BROWN, VERY FINE, SILTY, CLAYEY;
MOIST, OXIDIZED
22.0 - 58.0 SAND, GRAY, VERY FINE, VERY SILTY; MOIST,
UNOXIDIZED

* * * *

TEST HOLE NUMBER: 93
LOCATION: 091N-50W-21AAAD
LEGAL LOCATION: SE NE NE NE SEC. 21, T. 091 N., R. 50 W.

20.0 - 95.0 SAND, LIGHT-GRAY-BROWN, FINE; SEVERAL
THIN CLAY LENSES

* * * *

TEST HOLE NUMBER: 94
LOCATION: 091N-50W-22AC
LEGAL LOCATION: SW NE SEC. 22, T. 091 N., R. 50 W.

0 - 57.0 SAND, FINE

* * * *

TEST HOLE NUMBER: 95
LOCATION: 091N-50W-23CA
LEGAL LOCATION: NE SW SEC. 23, T. 091 N., R. 50 W.

1.0 - 39.0 SAND, FINE

* * * *

TEST HOLE NUMBER: 96
LOCATION: 091N-50W-28AACC
LEGAL LOCATION: SW SW NE NE SEC. 28, T. 091 N., R. 50 W.

1.0 - 19.0 SAND, BROWN, FINE TO MEDIUM; OXIDIZED
19.0 - 58.0 SAND, GRAY, FINE TO MEDIUM; UNOXIDIZED

* * * *

TEST HOLE NUMBER: 97
LOCATION: 091N-50W-30DBAA
LEGAL LOCATION: NE NE NW SE SEC. 30, T. 091 N., R. 50 W.

0 - 15.0 SAND, LIGHT-BROWN, VERY FINE, SILTY; VERY
CLEAN, DRY, OXIDIZED
15.0 - 58.0 SAND, GRAY, FINE, VERY SILTY; CLEAN,
MOIST, UNOXIDIZED

* * * *

TEST HOLE NUMBER: 98
LOCATION: 091N-50W-36ABBB
LEGAL LOCATION: NW NW NW NE SEC. 36, T. 091 N., R. 50 W.

0 - 30.0 SAND, BROWN, FINE

* * * *

TEST HOLE NUMBER: 99
LOCATION: 092N-49W-02BDDB
LEGAL LOCATION: NE SE SE NW SEC. 02, T. 092 N., R. 49 W.

14.0 - 25.0 SAND, BROWN, MEDIUM TO COARSE, SLIGHTLY
CLAYEY; OXIDIZED
25.0 - 30.0 SAND AND GRAVEL, BROWN, MEDIUM TO COARSE
SAND, MEDIUM TO COARSE GRAVEL; OXIDIZED

* * * *

TEST HOLE NUMBER: 100
LOCATION: 092N-49W-10ADDD
LEGAL LOCATION: SE SE SE NE SEC. 10, T. 092 N., R. 49 W.

25.0 - 31.0 SAND, TAN-BROWN, FINE TO MEDIUM, VERY
SILTY, VERY CLAYEY

* * * *

TEST HOLE NUMBER: 101
LOCATION: 092N-49W-11BAAA 1
LEGAL LOCATION: NE NE NE NW SEC. 11, T. 092 N., R. 49 W.

16.0 - 36.0 GRAVEL, COARSE TO MEDIUM; WITH SOME SAND

* * * *

TEST HOLE NUMBER: 102
LOCATION: 092N-49W-11BAAA 2
LEGAL LOCATION: NE NE NE NW SEC. 11, T. 092 N., R. 49 W.

12.0 - 15.0 SAND, FINE, SILTY
15.0 - 59.0 GRAVEL, MEDIUM TO COARSE; WITH SAND

* * * *

TEST HOLE NUMBER: 103
LOCATION: 092N-49W-11BBAA
LEGAL LOCATION: NE NE NW NW SEC. 11, T. 092 N., R. 49 W.

18.0 - 29.0 SAND, GRAY, FINE TO MEDIUM, SLIGHTLY
CLAYEY; UNOXIDIZED, SATURATED

* * * *

TEST HOLE NUMBER: 104
LOCATION: 092N-49W-15AAAA 1
LEGAL LOCATION: NE NE NE NE SEC. 15, T. 092 N., R. 49 W.

18.0 - 25.0 SAND, MEDIUM; WITH GRAVEL
25.0 - 56.0 GRAVEL, COARSE, SANDY

* * * *

TEST HOLE NUMBER: 105
LOCATION: 092N-49W-15AAAA 2
LEGAL LOCATION: NE NE NE NE SEC. 15, T. 092 N., R. 49 W.

18.0 - 36.0 GRAVEL, MEDIUM TO FINE, SANDY, SILTY

* * * *

TEST HOLE NUMBER: 106
LOCATION: 092N-49W-15ABBB
LEGAL LOCATION: NW NW NW NE SEC. 15, T. 092 N., R. 49 W.

6.0 - 58.0 SAND, GRAY, FINE TO MEDIUM; UNOXIDIZED

* * * *

TEST HOLE NUMBER: 107

LOCATION: 092N-49W-19DDAA

LEGAL LOCATION: NE NE SE SE SEC. 19, T. 092 N., R. 49 W.

5.0 - 26.0 SAND AND GRAVEL, BROWN, MEDIUM TO COARSE
SAND, COARSE GRAVEL; OXIDIZED

* * * *

TEST HOLE NUMBER: 108

LOCATION: 092N-49W-21BB

LEGAL LOCATION: NW NW SEC. 21, T. 092 N., R. 49 W.

4.0 - 6.0 GRAVEL, MEDIUM
6.0 - 9.0 SAND, MEDIUM
9.0 - 14.0 GRAVEL, MEDIUM
15.0 - 44.0 GRAVEL, MEDIUM

* * * *

TEST HOLE NUMBER: 109

LOCATION: 092N-49W-21BD

LEGAL LOCATION: SE NW SEC. 21, T. 092 N., R. 49 W.

19.0 - 24.0 SAND, COARSE

* * * *

TEST HOLE NUMBER: 110

LOCATION: 092N-49W-21CBBC

LEGAL LOCATION: SW NW NW SW SEC. 21, T. 092 N., R. 49 W.

20.0 - 24.0 SAND, DARK-BROWN, MEDIUM, CLAYEY; MOIST,
OXIDIZED
24.0 - 58.0 SAND, DARK-BROWN, MEDIUM; OXIDIZED,
SATURATED, CLEAN

* * * *

TEST HOLE NUMBER: 111

LOCATION: 092N-49W-28BBBB

LEGAL LOCATION: NW NW NW NW SEC. 28, T. 092 N., R. 49 W.

4.0 - 57.0 SAND, MEDIUM

* * * *

TEST HOLE NUMBER: 112

LOCATION: 092N-49W-28BDAA

LEGAL LOCATION: NE NE SE NW SEC. 28, T. 092 N., R. 49 W.

20.0 - 28.0 SAND, FINE

* * * *

TEST HOLE NUMBER: 113
LOCATION: 092N-49W-29BAAD
LEGAL LOCATION: SE NE NE NW SEC. 29, T. 092 N., R. 49 W.

6.0 - 23.0 SAND AND GRAVEL, YELLOW-BROWN, FINE TO
MEDIUM SAND, MEDIUM GRAVEL, CLAYEY;
OXIDIZED
23.0 - 58.0 SAND, YELLOW-BROWN, FINE TO MEDIUM,
SLIGHTLY CLAYEY; OXIDIZED

* * * *

TEST HOLE NUMBER: 114
LOCATION: 092N-49W-29DCDA
LEGAL LOCATION: NE SE SW SE SEC. 29, T. 092 N., R. 49 W.

8.0 - 105.0 SAND AND GRAVEL, MEDIUM SAND TO A FINE
GRAVEL

* * * *

TEST HOLE NUMBER: 115
LOCATION: 092N-49W-30ABCD
LEGAL LOCATION: SE SW NW NE SEC. 30, T. 092 N., R. 49 W.

0 - 12.0 SAND, DARK-REDDISH-BROWN, FINE, SLIGHTLY
SILTY; SOME FINE GRAVEL, DRY, OXIDIZED
12.0 - 58.0 SAND, LIGHT-BROWN, FINE, CLAYEY; SOME
FINE GRAVEL, MOIST TO SATURATED,
OXIDIZED

* * * *

TEST HOLE NUMBER: 116
LOCATION: 092N-50W-04DAAA 7
LEGAL LOCATION: NE NE NE SE SEC. 04, T. 092 N., R. 50 W.

6.0 - 9.0 SAND; SOME CLAY, YELLOWISH-BROWN

* * * *

TEST HOLE NUMBER: 117
LOCATION: 092N-50W-22DDDD
LEGAL LOCATION: SE SE SE SE SEC. 22, T. 092 N., R. 50 W.

2.0 - 3.0 GRAVEL

* * * *

TEST HOLE NUMBER: 118
LOCATION: 092N-50W-24AAAA
LEGAL LOCATION: NE NE NE NE SEC. 24, T. 092 N., R. 50 W.

19.0 - 40.0 GRAVEL, FINE TO MEDIUM, SANDY (GLACIAL

OUTWASH)

* * * *

TEST HOLE NUMBER: 119
LOCATION: 092N-50W-25ABCC
LEGAL LOCATION: SW SW NW NE SEC. 25, T. 092 N., R. 50 W.

10.0 - 15.0 SAND, TAN-BROWN, SILTY, CLAYEY; OXIDIZED,
SATURATED
15.0 - 17.0 GRAVEL, FLESH-BROWN, MEDIUM TO COARSE,
SILTY, SANDY; SATURATED, OXIDIZED

* * * *

TEST HOLE NUMBER: 120
LOCATION: 092N-50W-25DDCC
LEGAL LOCATION: SW SW SE SE SEC. 25, T. 092 N., R. 50 W.

23.0 - 58.0 SAND, LIGHT-BROWN, FINE TO MEDIUM; CLEAN,
SATURATED, OXIDIZED

* * * *

TEST HOLE NUMBER: 121
LOCATION: 092N-50W-31DDDD
LEGAL LOCATION: SE SE SE SE SEC. 31, T. 092 N., R. 50 W.

16.0 - 58.0 SAND, TAN, FINE TO MEDIUM, SLIGHTLY
CLAYEY; OXIDIZED, MOIST

* * * *

TEST HOLE NUMBER: 122
LOCATION: 092N-50W-32BBBB
LEGAL LOCATION: NW NW NW NW SEC. 32, T. 092 N., R. 50 W.

12.0 - 58.0 SAND, GRAYISH-BROWN, FINE, SILTY; MOIST,
OXIDIZED

* * * *

TEST HOLE NUMBER: 123
LOCATION: 092N-50W-35CA
LEGAL LOCATION: NE SW SEC. 35, T. 092 N., R. 50 W.

21.0 - 42.0 SAND, FINE; AND SILT

* * * *

TEST HOLE NUMBER: 124
LOCATION: 093N-48W-07DCDA
LEGAL LOCATION: NE SE SW SE SEC. 07, T. 093 N., R. 48 W.

4.0 - 22.0 SAND, MEDIUM
22.0 - 47.0 SAND AND GRAVEL, COARSE SAND TO A MEDIUM GRAVEL

* * * *

TEST HOLE NUMBER: 125
LOCATION: 093N-48W-08BCDC
LEGAL LOCATION: SW SE SW NW SEC. 08, T. 093 N., R. 48 W.

16.0 - 56.0 SAND, MEDIUM

* * * *

TEST HOLE NUMBER: 126
LOCATION: 093N-48W-08BDAA
LEGAL LOCATION: NE NE SE NW SEC. 08, T. 093 N., R. 48 W.

10.0 - 53.0 GRAVEL

* * * *

TEST HOLE NUMBER: 127
LOCATION: 093N-48W-18DCCD
LEGAL LOCATION: SE SW SW SE SEC. 18, T. 093 N., R. 48 W.

2.0 - 8.0 SAND AND GRAVEL, MEDIUM TO COARSE
8.0 - 48.0 SAND, MEDIUM

* * * *

TEST HOLE NUMBER: 128
LOCATION: 093N-48W-30BB
LEGAL LOCATION: NW NW SEC. 30, T. 093 N., R. 48 W.

8.0 - 15.0 SAND, FINE
15.0 - 47.0 GRAVEL, MEDIUM

* * * *

TEST HOLE NUMBER: 129
LOCATION: 093N-48W-30CCAC
LEGAL LOCATION: SW NE SW SW SEC. 30, T. 093 N., R. 48 W.

18.0 - 26.0 GRAVEL, FINE TO MEDIUM; WITH SAND

* * * *

TEST HOLE NUMBER: 130
LOCATION: 093N-49W-14CDDC
LEGAL LOCATION: SW SE SE SW SEC. 14, T. 093 N., R. 49 W.

11.0 - 21.0 SAND, BROWN, MEDIUM TO COARSE, SILTY,
PEBBLY; OXIDIZED

* * * *

TEST HOLE NUMBER: 131
LOCATION: 093N-49W-18CCCC
LEGAL LOCATION: SW SW SW SW SEC. 18, T. 093 N., R. 49 W.

23.0 - 28.0 SAND, GRAY, FINE TO MEDIUM, VERY SILTY

* * * *

TEST HOLE NUMBER: 132
LOCATION: 093N-49W-24DAAA
LEGAL LOCATION: NE NE NE SE SEC. 24, T. 093 N., R. 49 W.

6.0 - 45.0 GRAVEL, MEDIUM COARSE

* * * *

TEST HOLE NUMBER: 133
LOCATION: 093N-49W-25AAAA
LEGAL LOCATION: NE NE NE NE SEC. 25, T. 093 N., R. 49 W.

17.0 - 48.0 SAND, MEDIUM

* * * *

TEST HOLE NUMBER: 134
LOCATION: 093N-49W-25ABBB
LEGAL LOCATION: NW NW NW NE SEC. 25, T. 093 N., R. 49 W.

14.0 - 56.0 SAND, MEDIUM

* * * *

TEST HOLE NUMBER: 135
LOCATION: 093N-49W-25CCCB 1
LEGAL LOCATION: NW SW SW SW SEC. 25, T. 093 N., R. 49 W.

18.0 - 20.0 SAND, MEDIUM
20.0 - 36.0 GRAVEL, MEDIUM TO COARSE

* * * *

TEST HOLE NUMBER: 136
LOCATION: 093N-49W-25CCCB 2
LEGAL LOCATION: NW SW SW SW SEC. 25, T. 093 N., R. 49 W.

25.0 - 49.0 GRAVEL, MEDIUM TO COARSE

* * * *

TEST HOLE NUMBER: 137
LOCATION: 093N-49W-26BBBC
LEGAL LOCATION: SW NW NW NW SEC. 26, T. 093 N., R. 49 W.

11.0 - 13.0 SAND, BROWN, SILTY
25.0 - 33.0 GRAVEL, FINE TO MEDIUM; WITH SAND

* * * *

TEST HOLE NUMBER: 138
LOCATION: 093N-49W-35CBCB
LEGAL LOCATION: NW SW NW SW SEC. 35, T. 093 N., R. 49 W.

9.0 - 32.0 SAND, BROWN, FINE TO MEDIUM

* * * *

TEST HOLE NUMBER: 139
LOCATION: 093N-49W-35DDDA
LEGAL LOCATION: NE SE SE SE SEC. 35, T. 093 N., R. 49 W.

10.0 - 46.0 SAND, MEDIUM; HARD LAYERS

* * * *

TEST HOLE NUMBER: 140
LOCATION: 093N-49W-35DDDA 1
LEGAL LOCATION: NE SE SE SE SEC. 35, T. 093 N., R. 49 W.

7.0 - 53.0 GRAVEL, MEDIUM, SANDY

* * * *

TEST HOLE NUMBER: 141
LOCATION: 093N-49W-36BBBB
LEGAL LOCATION: NW NW NW NW SEC. 36, T. 093 N., R. 49 W.

5.0 - 33.0 SAND, FINE TO MEDIUM

* * * *

TEST HOLE NUMBER: 142
LOCATION: 093N-50W-05DCCD
LEGAL LOCATION: SE SW SW SE SEC. 05, T. 093 N., R. 50 W.

4.0 - 23.0 SAND, ORANGE-BROWN, MEDIUM TO COARSE,
CLAYEY, GRAVELLY; OXIDIZED, SATURATED
AT 18 FEET

* * * *

TEST HOLE NUMBER: 143
LOCATION: 093N-50W-15CCBB
LEGAL LOCATION: NW NW SW SW SEC. 15, T. 093 N., R. 50 W.

7.0 - 18.0 SAND, YELLOW-BROWN, FINE, SILTY (EOLIAN?)
18.0 - 44.0 SAND, YELLOW-BROWN, FINE TO MEDIUM
(EOLIAN?)

* * * *

TEST HOLE NUMBER: 144
LOCATION: 093N-50W-16BBCC
LEGAL LOCATION: SW SW NW NW SEC. 16, T. 093 N., R. 50 W.

12.0 - 21.0 SAND, BROWN, FINE TO MEDIUM, PEBBLY,
SLIGHTLY CLAYEY; OXIDIZED

* * * *

TEST HOLE NUMBER: 145
LOCATION: 093N-50W-16BCCC
LEGAL LOCATION: SW SW SW NW SEC. 16, T. 093 N., R. 50 W.

16.0 - 18.0 SAND AND GRAVEL, MEDIUM SAND, FINE
GRAVEL, VERY SILTY, VERY CLAYEY;
SATURATED

* * * *

TEST HOLE NUMBER: 146
LOCATION: 093N-50W-22BCCA
LEGAL LOCATION: NE SW SW NW SEC. 22, T. 093 N., R. 50 W.

17.0 - 33.0 SAND AND GRAVEL; COMPOSED OF VARIOUS
TYPES OF SEDIMENTARY AND IGNEOUS ROCKS
(GLACIAL)

* * * *

TEST HOLE NUMBER: 147
LOCATION: 093N-50W-23CBCB
LEGAL LOCATION: NW SW NW SW SEC. 23, T. 093 N., R. 50 W.

16.0 - 26.0 SAND, REDDISH-BROWN, FINE TO MEDIUM,
VERY SILTY; MOIST, OXIDIZED

* * * *

TEST HOLE NUMBER: 148
LOCATION: 094N-48W-04DCBC
LEGAL LOCATION: SW NW SW SE SEC. 04, T. 094 N., R. 48 W.

14.0 - 16.0 SAND, MEDIUM

* * * *

TEST HOLE NUMBER: 149
LOCATION: 094N-48W-09DCBC
LEGAL LOCATION: SW NW SW SE SEC. 09, T. 094 N., R. 48 W.

16.0 - 27.0 SAND, MEDIUM; SOME CLAY

* * * *

TEST HOLE NUMBER: 150
LOCATION: 094N-48W-17DDDD
LEGAL LOCATION: SE SE SE SE SEC. 17, T. 094 N., R. 48 W.

21.0 - 47.0 SAND, MEDIUM

* * * *

TEST HOLE NUMBER: 151
LOCATION: 094N-48W-21AAAA
LEGAL LOCATION: NE NE NE NE SEC. 21, T. 094 N., R. 48 W.

16.0 - 40.0 SAND, TAN-BROWN, VERY SILTY, VERY CLAYEY,
GRAVELLY; OXIDIZED, SATURATED

* * * *

TEST HOLE NUMBER: 152
LOCATION: 094N-48W-21BAAA
LEGAL LOCATION: NE NE NE NW SEC. 21, T. 094 N., R. 48 W.

16.0 - 47.0 SAND, MEDIUM

* * * *

TEST HOLE NUMBER: 153
LOCATION: 094N-48W-21BDAB
LEGAL LOCATION: NW NE SE NW SEC. 21, T. 094 N., R. 48 W.

20.0 - 26.0 SAND AND GRAVEL, TAN, MEDIUM TO COARSE
SAND, SILTY, CLAYEY; OXIDIZED

* * * *

TEST HOLE NUMBER: 154
LOCATION: 094N-48W-28BBAB
LEGAL LOCATION: NW NE NW NW SEC. 28, T. 094 N., R. 48 W.

7.0 - 37.0 SAND, MEDIUM

* * * *

TEST HOLE NUMBER: 155
LOCATION: 094N-48W-28BBBA
LEGAL LOCATION: NE NW NW NW SEC. 28, T. 094 N., R. 48 W.

7.0 - 38.0 GRAVEL, MEDIUM TO COARSE, SANDY

* * * *

TEST HOLE NUMBER: 156
LOCATION: 094N-48W-29DABB

LEGAL LOCATION: NW NW NE SE SEC. 29, T. 094 N., R. 48 W.

8.0 - 20.0 SAND, MEDIUM

* * * *

TEST HOLE NUMBER: 157

LOCATION: 094N-48W-32BDBA

LEGAL LOCATION: NE NW SE NW SEC. 32, T. 094 N., R. 48 W.

13.0 - 39.0 SAND, MEDIUM

* * * *

TEST HOLE NUMBER: 158

LOCATION: 094N-48W-32CDBA

LEGAL LOCATION: NE NW SE SW SEC. 32, T. 094 N., R. 48 W.

13.0 - 18.0 SAND, MEDIUM

* * * *

TEST HOLE NUMBER: 159

LOCATION: 094N-49W-01ADAA

LEGAL LOCATION: NE NE SE NE SEC. 01, T. 094 N., R. 49 W.

18.0 - 25.0 SAND, YELLOW; ROCKS AT 23-25 FEET

* * * *

TEST HOLE NUMBER: 160

LOCATION: 094N-49W-11DCCD

LEGAL LOCATION: SE SW SW SE SEC. 11, T. 094 N., R. 49 W.

0 - 1.0 SAND, BROWN, FINE TO MEDIUM, SILTY;
OXIDIZED, DRY

16.0 - 30.0 SAND, TAN-BROWN, MEDIUM TO COARSE, VERY
CLAYEY, PEBBLY; OXIDIZED, SATURATED,
GRAVELLY FROM 20 TO 30 FEET

* * * *

TEST HOLE NUMBER: 161

LOCATION: 094N-49W-23BAAA

LEGAL LOCATION: NE NE NE NW SEC. 23, T. 094 N., R. 49 W.

21.0 - 53.0 SAND, LIGHT-BROWN, FINE, SILTY; MOIST,
OXIDIZED, CLEAN

* * * *

TEST HOLE NUMBER: 162

LOCATION: 094N-49W-34CCCC

LEGAL LOCATION: SW SW SW SW SEC. 34, T. 094 N., R. 49 W.

18.0 - 29.0 GRAVEL, COARSE TO MEDIUM, SANDY; VARIED
MINERALOGY, CONTAINS MANY SOFT ROCK
CLASTS IN ADDITION TO WESTERN SAND

* * * *

TEST HOLE NUMBER: 163
LOCATION: 094N-49W-34CCCC 1
LEGAL LOCATION: SW SW SW SW SEC. 34, T. 094 N., R. 49 W.

18.0 - 28.0 GRAVEL, COARSE TO MEDIUM, SANDY (REWORKED
WESTERN SAND)

* * * *

TEST HOLE NUMBER: 164
LOCATION: 094N-49W-35CCDD
LEGAL LOCATION: SE SE SW SW SEC. 35, T. 094 N., R. 49 W.

2.0 - 9.0 SAND, DARK-BROWN, FINE, VERY CLAYEY;
OXIDIZED, MOIST
9.0 - 24.0 SAND, REDDISH-BROWN, MEDIUM TO COARSE;
OXIDIZED, SATURATED, CLEAN (WESTERN
DERIVED?)

* * * *

TEST HOLE NUMBER: 165
LOCATION: 094N-50W-01BBBB
LEGAL LOCATION: NW NW NW NW SEC. 01, T. 094 N., R. 50 W.

5.0 - 10.0 SAND, BROWN, FINE TO MEDIUM, WELL SORTED;
NO GRAVEL
10.0 - 45.0 SAND, GRAY, FINE TO MEDIUM, WELL SORTED;
NO GRAVEL

* * * *

TEST HOLE NUMBER: 166
LOCATION: 094N-50W-02BBBA
LEGAL LOCATION: NE NW NW NW SEC. 02, T. 094 N., R. 50 W.

4.0 - 19.0 SAND, REDDISH-BROWN, FINE TO MEDIUM;
CLEAN, QUARTZOSE, MOIST, OXIDIZED

* * * *

TEST HOLE NUMBER: 167
LOCATION: 094N-50W-03CDDD
LEGAL LOCATION: SE SE SE SW SEC. 03, T. 094 N., R. 50 W.

0 - 10.0 SAND, REDDISH-BROWN, FINE TO MEDIUM;
OXIDIZED, MOIST, CLEAN
10.0 - 15.0 SAND, REDDISH-BROWN, FINE TO MEDIUM;

OXIDIZED, SATURATED

* * * *

TEST HOLE NUMBER: 168
LOCATION: 094N-50W-03DDDD
LEGAL LOCATION: SE SE SE SE SEC. 03, T. 094 N., R. 50 W.

1.0 - 18.0 SAND, BROWN, FINE
21.0 - 45.0 SAND, BROWN, FINE TO MEDIUM

* * * *

TEST HOLE NUMBER: 169
LOCATION: 094N-50W-04AAAA
LEGAL LOCATION: NE NE NE NE SEC. 04, T. 094 N., R. 50 W.

11.0 - 16.0 SAND, MEDIUM BROWN

* * * *

TEST HOLE NUMBER: 170
LOCATION: 094N-50W-04AAAA 2
LEGAL LOCATION: NE NE NE NE SEC. 04, T. 094 N., R. 50 W.

2.0 - 10.0 GRAVEL, MEDIUM, SANDY, ANGULAR;
ABUNDANT CONCRETIONS AND SOFT ROCK
CLASTS

* * * *

TEST HOLE NUMBER: 171
LOCATION: 094N-50W-09ADAA
LEGAL LOCATION: NE NE SE NE SEC. 09, T. 094 N., R. 50 W.

3.0 - 11.0 SAND, LIGHT-BROWN, VERY FINE, SLIGHTLY
SILTY; MOIST, OXIDIZED

* * * *

TEST HOLE NUMBER: 172
LOCATION: 094N-50W-09DDDC
LEGAL LOCATION: SW SE SE SE SEC. 09, T. 094 N., R. 50 W.

16.0 - 51.0 SAND, GRAY, FINE TO MEDIUM, SLIGHTLY
SILTY, SLIGHTLY CLAYEY; SOME COAL
FRAGMENTS

* * * *

TEST HOLE NUMBER: 173
LOCATION: 094N-50W-21AABA
LEGAL LOCATION: NE NW NE NE SEC. 21, T. 094 N., R. 50 W.

0 - 2.0 SAND, REDDISH-BROWN, FINE TO MEDIUM,
CLAYEY; OXIDIZED, MOIST
21.0 - 31.0 SAND, REDDISH-BROWN, VERY FINE, SLIGHTLY
CLAYEY, SILTY; OXIDIZED, SATURATED

* * * *

TEST HOLE NUMBER: 174
LOCATION: 094N-50W-30DDCD
LEGAL LOCATION: SE SW SE SE SEC. 30, T. 094 N., R. 50 W.

1.0 - 12.0 SAND AND GRAVEL, REDDISH-BROWN, MEDIUM
SAND, MEDIUM TO COARSE GRAVEL, CLAYEY;
OXIDIZED

* * * *

TEST HOLE NUMBER: 175
LOCATION: 094N-50W-31BCCC
LEGAL LOCATION: SW SW SW NW SEC. 31, T. 094 N., R. 50 W.

23.0 - 28.0 SAND AND GRAVEL, ANGULAR; SOME WATER
WORN, SOME DERIVED FROM IGNEOUS ROCKS

* * * *

TEST HOLE NUMBER: 176
LOCATION: 094N-50W-32BBCD
LEGAL LOCATION: SE SW NW NW SEC. 32, T. 094 N., R. 50 W.

0 - 11.0 SAND, RED-BROWN, FINE TO MEDIUM, SLIGHTLY
CLAYEY, PEBBLY

* * * *

TEST HOLE NUMBER: 177
LOCATION: 095N-48W-01CDA 1
LEGAL LOCATION: NE NE SE SW SEC. 01, T. 095 N., R. 48 W.

1.0 - 9.0 SAND AND GRAVEL, MEDIUM TO COARSE

* * * *

TEST HOLE NUMBER: 178
LOCATION: 095N-48W-02AAAA
LEGAL LOCATION: NE NE NE NE SEC. 02, T. 095 N., R. 48 W.

3.0 - 32.0 SAND AND GRAVEL, MEDIUM

* * * *

TEST HOLE NUMBER: 179
LOCATION: 095N-48W-02CCDD
LEGAL LOCATION: SE SE SW SW SEC. 02, T. 095 N., R. 48 W.

7.0 - 16.0 SAND AND GRAVEL, TAN, MEDIUM TO COARSE
SAND, FINE TO MEDIUM GRAVEL; OXIDIZED
16.0 - 34.0 SAND AND GRAVEL, TAN, FINE TO MEDIUM
SAND, MEDIUM TO COARSE GRAVEL; OXIDIZED

* * * *

TEST HOLE NUMBER: 180
LOCATION: 095N-48W-02DDDD
LEGAL LOCATION: SE SE SE SE SEC. 02, T. 095 N., R. 48 W.

9.0 - 42.0 SAND, MEDIUM TO COARSE

* * * *

TEST HOLE NUMBER: 181
LOCATION: 095N-48W-03AAAB
LEGAL LOCATION: NW NE NE NE SEC. 03, T. 095 N., R. 48 W.

4.0 - 12.0 SAND, FINE TO MEDIUM
12.0 - 29.0 GRAVEL, VERY SANDY

* * * *

TEST HOLE NUMBER: 182
LOCATION: 095N-48W-03CBBB
LEGAL LOCATION: NW NW NW SW SEC. 03, T. 095 N., R. 48 W.

16.0 - 45.0 SAND, BROWN, FINE TO MEDIUM, SILTY,
CLAYEY; OXIDIZED

* * * *

TEST HOLE NUMBER: 183
LOCATION: 095N-48W-05ABBB
LEGAL LOCATION: NW NW NW NE SEC. 05, T. 095 N., R. 48 W.

18.0 - 58.0 SAND, GRAY, FINE, CLAYEY; UNOXIDIZED

* * * *

TEST HOLE NUMBER: 184
LOCATION: 095N-48W-10BBBB
LEGAL LOCATION: NW NW NW NW SEC. 10, T. 095 N., R. 48 W.

13.0 - 17.0 SAND, MEDIUM

* * * *

TEST HOLE NUMBER: 185
LOCATION: 095N-48W-10CABC
LEGAL LOCATION: SW NW NE SW SEC. 10, T. 095 N., R. 48 W.

12.0 - 22.0 SAND, GRAY-BLACK, MEDIUM, SILTY, VERY

CLAYEY; SATURATED, UNOXIDIZED

* * * *

TEST HOLE NUMBER: 186
LOCATION: 095N-48W-10CDCC
LEGAL LOCATION: SW SW SE SW SEC. 10, T. 095 N., R. 48 W.

1.0 - 19.0 SAND AND GRAVEL, MEDIUM

* * * *

TEST HOLE NUMBER: 187
LOCATION: 095N-48W-19BBBC
LEGAL LOCATION: SW NW NW NW SEC. 19, T. 095 N., R. 48 W.

19.0 - 23.0 GRAVEL, FINE, ANGULAR

* * * *

TEST HOLE NUMBER: 188
LOCATION: 095N-48W-19CCCB
LEGAL LOCATION: NW SW SW SW SEC. 19, T. 095 N., R. 48 W.

12.0 - 21.0 SAND, TAN-BROWN, FINE TO MEDIUM
21.0 - 29.0 SAND, GRAY, VERY SILTY, CLAYEY

* * * *

TEST HOLE NUMBER: 189
LOCATION: 095N-48W-21BACA
LEGAL LOCATION: NE SW NE NW SEC. 21, T. 095 N., R. 48 W.

18.0 - 43.0 SAND, MEDIUM

* * * *

TEST HOLE NUMBER: 190
LOCATION: 095N-48W-27DCCC
LEGAL LOCATION: SW SW SW SE SEC. 27, T. 095 N., R. 48 W.

8.0 - 22.0 SAND, MEDIUM
22.0 - 26.0 SAND AND GRAVEL, MEDIUM TO COARSE

* * * *

TEST HOLE NUMBER: 191
LOCATION: 095N-48W-28ABBA
LEGAL LOCATION: NE NW NW NE SEC. 28, T. 095 N., R. 48 W.

10.0 - 17.0 GRAVEL, REDDISH-BROWN FINE TO MEDIUM;
QUARTZOSE, MOIST, OXIDIZED
17.0 - 48.0 GRAVEL, BLACK, COARSE; CLEAN, MOIST,
UNOXIDIZED, MOSTLY CHERT AND QUARTZ,

HIT ROCK, COULD NOT PENETRATE

* * * *

TEST HOLE NUMBER: 192
LOCATION: 095N-48W-28BABC
LEGAL LOCATION: SW NW NE NW SEC. 28, T. 095 N., R. 48 W.

18.0 - 21.0 SAND, MEDIUM

* * * *

TEST HOLE NUMBER: 193
LOCATION: 095N-48W-33AAAA
LEGAL LOCATION: NE NE NE NE SEC. 33, T. 095 N., R. 48 W.

10.0 - 31.0 SAND, MEDIUM

* * * *

TEST HOLE NUMBER: 194
LOCATION: 095N-48W-33DCAB
LEGAL LOCATION: NW NE SW SE SEC. 33, T. 095 N., R. 48 W.

21.0 - 23.0 SAND, YELLOW-BROWN, FINE; OXIDIZED
23.0 - 26.0 SAND, LIGHT-BROWN, FINE; OXIDIZED

* * * *

TEST HOLE NUMBER: 195
LOCATION: 095N-48W-34CBBB
LEGAL LOCATION: NW NW NW SW SEC. 34, T. 095 N., R. 48 W.

12.0 - 22.0 SAND, COARSE, SAMPLE TAKEN
22.0 - 28.0 GRAVEL, COARSE; ROCK

* * * *

TEST HOLE NUMBER: 196
LOCATION: 095N-49W-04AAAA
LEGAL LOCATION: NE NE NE NE SEC. 04, T. 095 N., R. 49 W.

21.0 - 28.0 SAND, REDDISH-BROWN, MEDIUM TO FINE,
SILTY (GLACIAL OUTWASH)

* * * *

TEST HOLE NUMBER: 197
LOCATION: 095N-49W-10BBBA
LEGAL LOCATION: NE NW NW NW SEC. 10, T. 095 N., R. 49 W.

10.0 - 29.0 SAND, TAN, MEDIUM, CLAYEY; OXIDIZED,
MOIST

* * * *

TEST HOLE NUMBER: 198
LOCATION: 095N-49W-16ABAB
LEGAL LOCATION: NW NE NW NE SEC. 16, T. 095 N., R. 49 W.

15.0 - 20.0 SAND, OLIVE-GREEN, FINE
20.0 - 30.0 SAND, GRAY, FINE

* * * *

TEST HOLE NUMBER: 199
LOCATION: 095N-49W-16DAAA
LEGAL LOCATION: NE NE NE SE SEC. 16, T. 095 N., R. 49 W.

15.0 - 19.0 SAND, LIGHT-YELLOWISH-BROWN, FINE TO
MEDIUM; MAINLY QUARTZ AND FELDSPAR WITH
SMALL SHALE FRAGMENTS

* * * *

TEST HOLE NUMBER: 200
LOCATION: 095N-49W-21ADAD
LEGAL LOCATION: SE NE SE NE SEC. 21, T. 095 N., R. 49 W.

13.0 - 14.0 GRAVEL, BROWN, FINE

* * * *

TEST HOLE NUMBER: 201
LOCATION: 095N-49W-21BBBB
LEGAL LOCATION: NW NW NW NW SEC. 21, T. 095 N., R. 49 W.

20.0 - 25.0 SAND, GRAY, FINE; UNOXIDIZED, SATURATED

* * * *

TEST HOLE NUMBER: 202
LOCATION: 095N-49W-21CBCB
LEGAL LOCATION: NW SW NW SW SEC. 21, T. 095 N., R. 49 W.

21.0 - 27.0 GRAVEL, BROWN, MEDIUM

* * * *

TEST HOLE NUMBER: 203
LOCATION: 095N-49W-22ADDA
LEGAL LOCATION: NE SE SE NE SEC. 22, T. 095 N., R. 49 W.

21.0 - 29.0 GRAVEL, YELLOW-BROWN, FINE TO MEDIUM;
CONTAINS CARBONATE AND QUARTZ CLASTS

* * * *

TEST HOLE NUMBER: 204
LOCATION: 095N-49W-22CBBB
LEGAL LOCATION: NW NW NW SW SEC. 22, T. 095 N., R. 49 W.

2.0 - 3.0 GRAVEL, BROWN, FINE TO MEDIUM
18.0 - 19.0 GRAVEL, BROWN, MEDIUM

* * * *

TEST HOLE NUMBER: 205
LOCATION: 095N-49W-27BCDA
LEGAL LOCATION: NE SE SW NW SEC. 27, T. 095 N., R. 49 W.

15.0 - 24.0 GRAVEL, BROWN, FINE TO MEDIUM

* * * *

TEST HOLE NUMBER: 206
LOCATION: 095N-49W-28ABBB 1
LEGAL LOCATION: NW NW NW NE SEC. 28, T. 095 N., R. 49 W.

20.0 - 45.0 SAND, WHITE, COARSE, PEBBLY; COMPOSED OF
WHITE QUARTZ, PINK AND LIGHT-GREEN
FELDSPARS AND QUARTZ, NO SHALE CLASTS
NOTICED

* * * *

TEST HOLE NUMBER: 207
LOCATION: 095N-49W-28ABBB 2
LEGAL LOCATION: NW NW NW NE SEC. 28, T. 095 N., R. 49 W.

20.0 - 25.0 SAND, WHITE, COARSE; COMPOSED OF WHITE
QUARTZ, PINK AND LIGHT-GREEN FELDSPARS
AND QUARTZ, NO SHALE CLASTS NOTICED

* * * *

TEST HOLE NUMBER: 208
LOCATION: 095N-49W-28ACBA 1
LEGAL LOCATION: NE NW SW NE SEC. 28, T. 095 N., R. 49 W.

15.0 - 20.0 SAND, WHITE, FINE; COMPOSED OF WHITE
QUARTZ, PINK FELDSPAR

* * * *

TEST HOLE NUMBER: 209
LOCATION: 095N-49W-28ACBA 2
LEGAL LOCATION: NE NW SW NE SEC. 28, T. 095 N., R. 49 W.

15.0 - 56.0 SAND, WHITE, FINE TO MEDIUM;
PREDOMINATELY QUARTZ

* * * *

TEST HOLE NUMBER: 210
LOCATION: 095N-49W-28ACDB 1
LEGAL LOCATION: NW SE SW NE SEC. 28, T. 095 N., R. 49 W.

17.0 - 25.0 SAND, LIGHT-GRAY-BROWN, VERY FINE, VERY
SILTY, CLAYEY; COMPOSED MAINLY OF
QUARTZ SAND; OXIDIZED; MOIST (LOESS)
25.0 - 35.0 SAND, YELLOWISH-GRAY, VERY FINE, VERY
SILTY, CLAYEY; COMPOSED MAINLY OF
QUARTZ SAND; OXIDIZED; SATURATED
(LOESS)

* * * *

TEST HOLE NUMBER: 211
LOCATION: 095N-49W-28DABA
LEGAL LOCATION: NE NW NE SE SEC. 28, T. 095 N., R. 49 W.

15.0 - 33.0 SAND, DARK-BROWN, FINE TO MEDIUM, POORLY
SORTED

* * * *

TEST HOLE NUMBER: 212
LOCATION: 095N-49W-28DCDC
LEGAL LOCATION: SW SE SW SE SEC. 28, T. 095 N., R. 49 W.

16.0 - 20.0 SAND, BROWN, FINE TO MEDIUM, VERY SILTY,
CLAYEY (ALLUVIUM)
20.0 - 24.0 GRAVEL, WHITE, FINE; HAS WHITE SILT OR
CLAY STRINGER; PREDOMINATELY QUARTZ
GRAINS
24.0 - 33.0 SAND, WHITE, MEDIUM TO COARSE; WITH SOME
GRAVEL; PREDOMINATELY QUARTZ GRAINS

* * * *

TEST HOLE NUMBER: 213
LOCATION: 095N-49W-29AADD 1
LEGAL LOCATION: SE SE NE NE SEC. 29, T. 095 N., R. 49 W.

22.0 - 51.0 SAND AND GRAVEL, WHITE, SAND COARSE,
GRAVEL FINE TO MEDIUM; SAND HAD IRON
CONCRETIONS; PREDOMINATELY QUARTZ WITH
A FEW SMALL CLAY STRINGERS

* * * *

TEST HOLE NUMBER: 214
LOCATION: 095N-49W-29AADD 2
LEGAL LOCATION: SE SE NE NE SEC. 29, T. 095 N., R. 49 W.

22.0 - 27.0 SAND AND GRAVEL, WHITE, SAND COARSE,
GRAVEL FINE TO MEDIUM; PREDOMINATELY
QUARTZ

* * * *

TEST HOLE NUMBER: 215
LOCATION: 095N-49W-29CCBB
LEGAL LOCATION: NW NW SW SW SEC. 29, T. 095 N., R. 49 W.

23.0 - 58.0 SAND, GRAYISH-BROWN, MEDIUM TO COARSE,
SILTY; OXIDIZED, VERY CLEAN

* * * *

TEST HOLE NUMBER: 216
LOCATION: 095N-49W-30CDDD
LEGAL LOCATION: SE SE SE SW SEC. 30, T. 095 N., R. 49 W.

17.0 - 51.0 SAND, GRAY-BROWN, MEDIUM, SILTY;
OXIDIZED

* * * *

TEST HOLE NUMBER: 217
LOCATION: 095N-49W-31AADD
LEGAL LOCATION: SE SE NE NE SEC. 31, T. 095 N., R. 49 W.

10.0 - 12.0 SAND, BROWN, FINE TO COARSE; OXIDIZED,
DRY, UNSORTED, CLEAN

12.0 - 14.0 SAND, ORANGE, FINE TO COARSE, SLIGHTLY
CLAYEY, SLIGHTLY GRAVELLY; OXIDIZED,
MOIST

14.0 - 58.0 SAND, TAN-BROWN, MEDIUM, CLAYEY; MOIST,
OXIDIZED, SATURATED AT 22 FEET

* * * *

TEST HOLE NUMBER: 218
LOCATION: 095N-49W-33CBBB 1
LEGAL LOCATION: NW NW NW SW SEC. 33, T. 095 N., R. 49 W.

4.0 - 24.0 SAND, BROWN, FINE TO MEDIUM; GLACIAL
OUTWASH SAND

* * * *

TEST HOLE NUMBER: 219
LOCATION: 095N-49W-33CBBB 2
LEGAL LOCATION: NW NW NW SW SEC. 33, T. 095 N., R. 49 W.

2.0 - 14.0 SAND, LIGHT-BROWN, MEDIUM; GLACIAL
OUTWASH SAND

* * * *

TEST HOLE NUMBER: 220
LOCATION: 095N-50W-02AADD
LEGAL LOCATION: SE SE NE NE SEC. 02, T. 095 N., R. 50 W.

9.0 -	13.0	SAND, REDDISH-BROWN, MEDIUM TO COARSE, SLIGHTLY GRAVELLY; MOIST, OXIDIZED
13.0 -	58.0	SAND, REDDISH-BROWN, MEDIUM TO COARSE, SLIGHTLY CLAYEY; SATURATED, OXIDIZED

* * * *

TEST HOLE NUMBER: 221
LOCATION: 095N-50W-02ADDA
LEGAL LOCATION: NE SE SE NE SEC. 02, T. 095 N., R. 50 W.

2.0 -	7.0	SAND AND GRAVEL, ORANGE-BROWN, MEDIUM SAND, MEDIUM TO COARSE GRAVEL, CLAYEY; OXIDIZED
7.0 -	23.0	SAND AND GRAVEL, LIGHT-BROWN, FINE SAND, MEDIUM GRAVEL, CLAYEY
23.0 -	58.0	SAND, TAN-BROWN, FINE TO MEDIUM, CLAYEY

* * * *

TEST HOLE NUMBER: 222
LOCATION: 095N-50W-02DDAD
LEGAL LOCATION: SE NE SE SE SEC. 02, T. 095 N., R. 50 W.

6.0 -	12.0	SAND AND GRAVEL, BROWN, MEDIUM SAND, MEDIUM TO COARSE GRAVEL, CLAYEY; OXIDIZED
12.0 -	22.0	SAND AND GRAVEL, BROWN, FINE SAND, MEDIUM GRAVEL, CLAYEY; OXIDIZED, SATURATED AT 16 FEET
22.0 -	58.0	SAND, GRAY-BROWN, FINE TO MEDIUM, SLIGHTLY CLAYEY; OXIDIZED, SATURATED

* * * *

TEST HOLE NUMBER: 223
LOCATION: 095N-50W-11BCBC
LEGAL LOCATION: SW NW SW NW SEC. 11, T. 095 N., R. 50 W.

23.0 -	33.0	SAND, REDDISH-BROWN, MEDIUM TO COARSE, SILTY, CLAYEY, PEBBLY; MOIST, OXIDIZED
--------	------	--

* * * *

TEST HOLE NUMBER: 224
LOCATION: 095N-50W-14BAAB
LEGAL LOCATION: NW NE NE NW SEC. 14, T. 095 N., R. 50 W.

1.0 - 35.0 SAND, BROWN, MEDIUM TO VERY COARSE; ALSO
SOME FINE GRAVEL, QUARTZ, SHALE, CHALK,
PINK SAND, GREEN GRAINS "REWORKED
WESTERN GRAVEL?" (OUTWASH)

* * * *

TEST HOLE NUMBER: 225
LOCATION: 095N-50W-14BCCC
LEGAL LOCATION: SW SW SW NW SEC. 14, T. 095 N., R. 50 W.

11.0 - 31.0 SAND, YELLOW-BROWN, MEDIUM, SILTY,
GRAVELLY; OXIDIZED

* * * *

TEST HOLE NUMBER: 226
LOCATION: 095N-50W-22AAAA
LEGAL LOCATION: NE NE NE NE SEC. 22, T. 095 N., R. 50 W.

6.0 - 28.0 SAND, BROWN, COARSE

* * * *

TEST HOLE NUMBER: 227
LOCATION: 095N-50W-23BBDD
LEGAL LOCATION: SE SE NW NW SEC. 23, T. 095 N., R. 50 W.

3.0 - 78.0 SAND, COARSE; WITH PEA-SIZED GRAVEL

* * * *

TEST HOLE NUMBER: 228
LOCATION: 095N-50W-27AADD
LEGAL LOCATION: SE SE NE NE SEC. 27, T. 095 N., R. 50 W.

3.0 - 13.0 SAND, TAN-BROWN, MEDIUM TO COARSE,
CLAYEY; SATURATED, OXIDIZED
13.0 - 58.0 SAND, TAN-BROWN, MEDIUM TO COARSE, WELL-
SORTED; SATURATED, OXIDIZED, CLEAN
(WESTERN SAND?)

* * * *

TEST HOLE NUMBER: 229
LOCATION: 095N-50W-35ADDD
LEGAL LOCATION: SE SE SE NE SEC. 35, T. 095 N., R. 50 W.

6.0 - 16.0 SAND, GREENISH-GRAYISH-BROWN, MEDIUM TO
COARSE; MOIST TO SATURATED, PARTIALLY
OXIDIZED

* * * *

TEST HOLE NUMBER: 230

LOCATION: 095N-50W-35BBBA

LEGAL LOCATION: NE NW NW NW SEC. 35, T. 095 N., R. 50 W.

1.0 - 52.0 SAND, BROWN, MEDIUM TO COARSE

* * * *

TABLE 2: List of sand and gravel pits in Union County on file at the Department of Transportation, Division of Highways, Pierre, South Dakota, and at the Department of Water and Natural Resources, Office of Surface Mining, Pierre, South Dakota.

EXPLANATION:

Column Description:

- a. Landowner and address
- b. Location - given in half and quarter sections, section number, township, and range
- c. Aggregate type
- d. Average thickness of deposits in feet
- e. Average thickness of overburden in feet

Pit 1

- a. Landowner: Higman Sand and Gravel - Akron, Iowa
- b. Location: W 1/2 SW 1/4 sec. 18, T. 92 N., R. 49 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): ----
- e. Overburden thickness (ft): ----

Pit 2

- a. Landowner: Higman Sand and Gravel - Akron, Iowa
- b. Location: SE 1/4 SW 1/4 sec. 18, T. 92 N., R. 49 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): ----
- e. Overburden thickness (ft): ----

Pit 3

- a. Landowner: Union County Highway Department - Elk Point
- b. Location: N 1/2 sec. 19, T. 92 N., R. 49 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): ----
- e. Overburden thickness (ft): ----

Pit 4

- a. Landowner: E. M. Horton - Elk Point
- b. Location: SE 1/4 NE 1/4 sec. 19, T. 92 N., R. 49 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): ----
- e. Overburden thickness (ft): ----

Pit 5

- a. Landowner: Clay County Highway Department - Vermillion
- b. Location: SE 1/4 NE 1/4 sec. 19, T. 92 N., R. 49 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): ----
- e. Overburden thickness (ft): ----

Pit 6

- a. Landowner: **Albert Anderson - Elk Point**
- b. Location: **NE 1/4 NW 1/4 sec. 19, T. 92 N., R. 49 W.**
- c. Aggregate type: **Gravel**
- d. Deposit thickness (ft): **13.1**
- e. Overburden thickness (ft): **4.8**

Pit 7

- a. Landowner: **Union County Highway Department - Elk Point**
- b. Location: **S 1/2 sec. 19, T. 92 N., R. 49 W.**
- c. Aggregate type: **Gravel**
- d. Deposit thickness (ft): **----**
- e. Overburden thickness (ft): **----**

Pit 8

- a. Landowner: **Department of Transportation - Pierre**
- b. Location: **N 1/2 SW 1/4 sec. 19, T. 92 N., R. 49 W.**
- c. Aggregate type: **Gravel**
- d. Deposit thickness (ft): **----**
- e. Overburden thickness (ft): **----**

Pit 9

- a. Landowner: **Jefferson Township - Elk Point**
- b. Location: **NW 1/4 SW 1/4 sec. 19, T. 92 N., R. 49 W.**
- c. Aggregate type: **Gravel**
- d. Deposit thickness (ft): **----**
- e. Overburden thickness (ft): **----**

Pit 10

- a. Landowner: **O. S. Groethe - Elk Point**
- b. Location: **SW 1/4 sec. 19, T. 92 N., R. 49 W.**
- c. Aggregate type: **Gravel**
- d. Deposit thickness (ft): **8.4**
- e. Overburden thickness (ft): **10.6**

Pit 11

- a. Landowner: **Richard Fennel - Elk Point**
- b. Location: **SW 1/4 sec. 19, T. 92 N., R. 49 W.**
- c. Aggregate type: **Gravel**
- d. Deposit thickness (ft): **----**
- e. Overburden thickness (ft): **----**

Pit 12

- a. Landowner: **Elk Point Township - Elk Point**
- b. Location: **NW 1/4 SE 1/4 sec. 19, T. 92 N., R. 49 W.**
- c. Aggregate type: **Gravel**
- d. Deposit thickness (ft): **----**
- e. Overburden thickness (ft): **----**

Pit 13

- a. Landowner: **W. H. Bihlmeyer - Elk Point**
- b. Location: **S 1/2 SE 1/4 sec. 19, T. 92 N., R. 49 W.**
- c. Aggregate type: **Gravel**
- d. Deposit thickness (ft): **14.5**
- e. Overburden thickness (ft): **4.4**

Pit 14

- a. Landowner: **Siouxland Sand and Gravel - Sioux City, Iowa**
- b. Location: **SW 1/4 SW 1/4 sec. 20, T. 92 N., R. 49 W.**
- c. Aggregate type: **Gravel**
- d. Deposit thickness (ft): **----**
- e. Overburden thickness (ft): **----**

Pit 15

- a. Landowner: **Orville V. Bailey - North Sioux City**
- b. Location: **SW 1/4 SW 1/4 sec. 20, T. 92 N., R. 49 W.**
- c. Aggregate type: **Gravel**
- d. Deposit thickness (ft): **----**
- e. Overburden thickness (ft): **----**

Pit 16

- a. Landowner: **Carl Blanchard - Elk Point**
- b. Location: **NW 1/4 NE 1/4 sec. 29, T. 92 N., R. 49 W.**
- c. Aggregate type: **Gravel**
- d. Deposit thickness (ft): **----**
- e. Overburden thickness (ft): **----**

Pit 17

- a. Landowner: **Siouxland Sand and Gravel - Sioux City, Iowa**
- b. Location: **NW 1/4 NW 1/4 sec. 29, T. 92 N., R. 49 W.**
- c. Aggregate type: **Gravel**
- d. Deposit thickness (ft): **----**
- e. Overburden thickness (ft): **----**

Pit 18

- a. Landowner: **Earl Horton/Ernest Bailey - Elk Point**
- b. Location: **NW 1/4 NW 1/4 sec. 29, T. 92 N., R. 49 W.**
- c. Aggregate type: **Gravel**
- d. Deposit thickness (ft): **----**
- e. Overburden thickness (ft): **----**

Pit 19

- a. Landowner: **Mark and Arlene Schreves - Richland**
- b. Location: **NE 1/4 NE 1/4 SW 1/4 sec. 29, T. 92 N., R. 49 W.**
- c. Aggregate type: **Gravel**
- d. Deposit thickness (ft): **----**
- e. Overburden thickness (ft): **----**

Pit 20

- a. Landowner: **Andy G. Peterson - Elk Point**
- b. Location: **SE 1/4 sec. 24, T. 92 N., R. 50 W.**
- c. Aggregate type: **Gravel**
- d. Deposit thickness (ft): **----**
- e. Overburden thickness (ft): **----**

Pit 21

- a. Landowner: **Percival and Thelma Peterson - Elk Point**
- b. Location: **N 1/2 NE 1/4 sec. 25, T. 92 N., R. 50 W.**
- c. Aggregate type: **Gravel**
- d. Deposit thickness (ft): **10.6**
- e. Overburden thickness (ft): **3.5**

Pit 22

- a. Landowner: **Union County - Elk Point**
- b. Location: **SW 1/4 sec. 58, T. 93 N., R. 48 W.**
- c. Aggregate type: **Gravel**
- d. Deposit thickness (ft): **----**
- e. Overburden thickness (ft): **----**

Pit 23

- a. Landowner: **Adolph Hitzeman**
- b. Location: **Section 8, T. 93 N., R. 48 W.**
- c. Aggregate type: **Gravel**
- d. Deposit thickness (ft): **----**
- e. Overburden thickness (ft): **----**

Pit 24

- a. Landowner: **Mrs. Robert Ross**
- b. Location: **Section 17, T. 93 N., R. 48 W.**
- c. Aggregate type: **Gravel**
- d. Deposit thickness (ft): **----**
- e. Overburden thickness (ft): **----**

Pit 25

- a. Landowner: **Mrs. Robert Ross**
- b. Location: **E 1/2 NE 1/4 sec. 18, T. 93 N., R. 48 W.**
- c. Aggregate type: **Gravel**
- d. Deposit thickness (ft): **----**
- e. Overburden thickness (ft): **----**

Pit 26

- a. Landowner: **Mrs. Mae Ross - Akron, Iowa**
- b. Location: **E 1/2 SW 1/4 sec. 18, T. 93 N., R. 48 W.**
- c. Aggregate type: **Sand and gravel**
- d. Deposit thickness (ft): **----**
- e. Overburden thickness (ft): **----**

Pit 27

- a. Landowner: **Mrs. Robert Ross**
- b. Location: **E 1/2 SE 1/4 sec. 18, T. 93 N., R. 48 W.**
- c. Aggregate type: **Gravel**
- d. Deposit thickness (ft): **----**
- e. Overburden thickness (ft): **----**

Pit 28

- a. Landowner: **Mrs. Mae Ross - Akron, Iowa**
- b. Location: **W 1/2 SE 1/4 sec. 18, T. 93 N., R. 48 W.**
- c. Aggregate type: **Sand and gravel**
- d. Deposit thickness (ft): **----**
- e. Overburden thickness (ft): **----**

Pit 29

- a. Landowner: **Carl Moir - Akron, Iowa**
- b. Location: **SW 1/4 sec. 19, T. 93 N., R. 48 W.**
- c. Aggregate type: **Gravel**
- d. Deposit thickness (ft): **----**
- e. Overburden thickness (ft): **----**

Pit 30

- a. Landowner: **Matt Lyle - Beresford**
- b. Location: **S 1/2 NE 1/4 sec. 5, T. 93 N., R. 50 W.**
- c. Aggregate type: **Gravel**
- d. Deposit thickness (ft): **----**
- e. Overburden thickness (ft): **----**

Pit 31

- a. Landowner: **Mrs. Ida Schmidt - Beresford**
- b. Location: **NW 1/4 sec. 5, T. 93 N., R. 50 W.**
- c. Aggregate type: **Gravel**
- d. Deposit thickness (ft): **----**
- e. Overburden thickness (ft): **----**

Pit 32

- a. Landowner: **Arnold Fleege - Beresford**
- b. Location: **E 1/2 SW 1/4 sec. 5, T. 93 N., R. 50 W.**
- c. Aggregate type: **Gravel**
- d. Deposit thickness (ft): **20**
- e. Overburden thickness (ft): **3**

Pit 33

- a. Landowner: **Higman Sand and Gravel - Akron, Iowa**
- b. Location: **NE 1/4 SW 1/4 sec. 5, T. 93 N., R. 50 W.**
- c. Aggregate type: **Gravel**
- d. Deposit thickness (ft): **----**
- e. Overburden thickness (ft): **----**

Pit 34

- a. Landowner: **Matt Lyle - Beresford**
- b. Location: **W 1/2 SE 1/4 sec. 5, T. 93 N., R. 50 W.**
- c. Aggregate type: **Gravel**
- d. Deposit thickness (ft): **----**
- e. Overburden thickness (ft): **----**

Pit 35

- a. Landowner: **William Lyle - Beresford**
- b. Location: **SE 1/4 sec. 5, T. 93 N., R. 50 W.**
- c. Aggregate type: **Gravel**
- d. Deposit thickness (ft): **----**
- e. Overburden thickness (ft): **----**

Pit 36

- a. Landowner: **Anna Crowley - Lennox**
- b. Location: **S 1/2 SW 1/4 sec. 5, T. 93 N., R. 50 W.**
- c. Aggregate type: **Sand**
- d. Deposit thickness (ft): **----**
- e. Overburden thickness (ft): **----**

Pit 37

- a. Landowner: **Amos Eidem - Burbank**
- b. Location: **NW 1/4 sec. 22, T. 93 N., R. 50 W.**
- c. Aggregate type: **Sand**
- d. Deposit thickness (ft): **6**
- e. Overburden thickness (ft): **1.5**

Pit 38

- a. Landowner: **Grace Satter - Akron, Iowa**
- b. Location: **SE 1/4 sec. 22, T. 93 N., R. 50 W.**
- c. Aggregate type: **Gravel**
- d. Deposit thickness (ft): **----**
- e. Overburden thickness (ft): **----**

Pit 39

- a. Landowner: **Emil Klenne - Akron, Iowa**
- b. Location: **SW 1/4 sec. 23, T. 93 N., R. 50 W.**
- c. Aggregate type: **Gravel**
- d. Deposit thickness (ft): **----**
- e. Overburden thickness (ft): **----**

Pit 40

- a. Landowner: **Clifford Burke - Hudson**
- b. Location: **NW 1/4 sec. 1, T. 95 N., R. 48 W.**
- c. Aggregate type: **Gravel**
- d. Deposit thickness (ft): **8**
- e. Overburden thickness (ft): **3**

Pit 41

- a. Landowner: Higan Sand and Gravel - Akron, Iowa
- b. Location: NW 1/4 sec. 2, T. 95 N., R. 48 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): ----
- e. Overburden thickness (ft): ----

Pit 42

- a. Landowner: Higan Sand and Gravel - Akron, Iowa
- b. Location: SE 1/4 sec. 8, T. 95 N., R. 48 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): 10
- e. Overburden thickness (ft): 2.5

Pit 43

- a. Landowner: ----
- b. Location: NE 1/4 sec. 17, T. 95 N., R. 48 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): ----
- e. Overburden thickness (ft): ----

Pit 44

- a. Landowner: Ray Saugstad - Hudson
- b. Location: NW 1/4 NE 1/4 sec. 28, T. 95 N., R. 48 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): 15
- e. Overburden thickness (ft): 2.5

Pit 45

- a. Landowner: Lillian Stark - Canton
- b. Location: NE 1/4 sec. 2, T. 95 N., R. 50 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): ----
- e. Overburden thickness (ft): ----

Pit 46

- a. Landowner: Leo Jensen - Beresford
- b. Location: SE 1/4 sec. 2, T. 95 N., R. 50 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): ----
- e. Overburden thickness (ft): ----

Pit 47

- a. Landowner: Quenton Miller - Beresford
- b. Location: S 1/2 sec. 11, T. 95 N., R. 50 W.
- c. Aggregate type: Gravel
- d. Deposit thickness (ft): ----
- e. Overburden thickness (ft): ----